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Leptospira Vaccine Evaluation

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I

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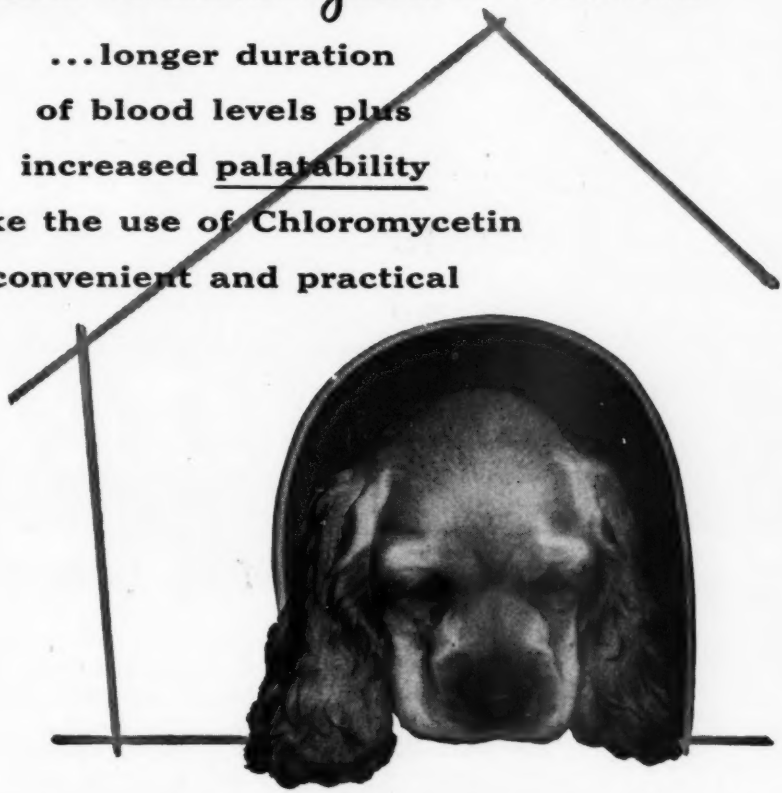

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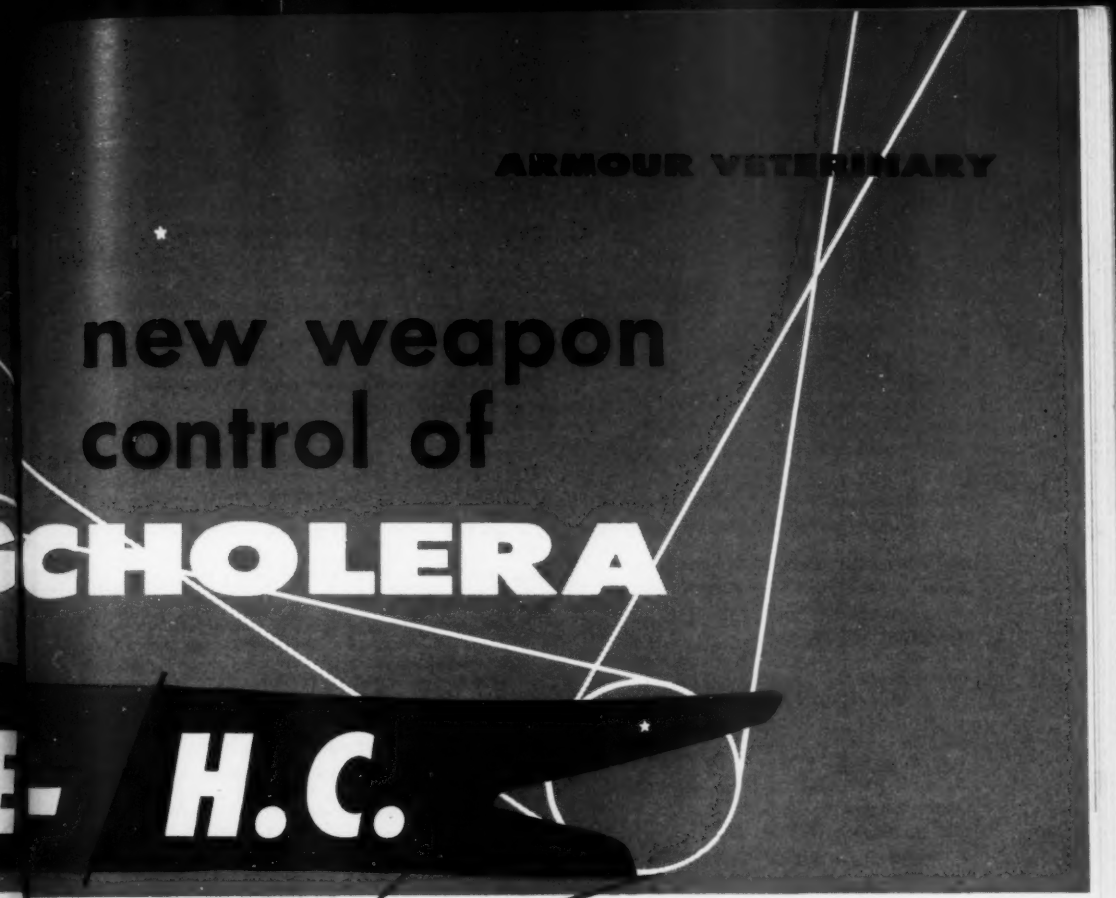

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Watch For

These and Other Informative Articles in Forthcoming Issues . .

ANTIBIOTIC SENSITIVITY TESTS OF MASTITIS CAUSING BACTERIA

A. R. Drury, D.V.M., M.S.

Tests on the efficacy of various antibiotics and combinations designed for the treatment of bovine mastitis demonstrate the variation of in vitro *response of microorganisms isolated from field cases of mastitis.*

ENDOTRACHEAL INTUBATION OF DOGS AND CATS

Rollin R. Smith, D.V.M.

Emphasized is advantage to be gained by use of this relatively simple technic, especially applicable to poor risk surgical patients.

DIAGNOSIS OF BOVINE KETOSIS

J. Allwyn Rogers, V.M.D.

A screening test is outlined that enables the author to differentiate ketosis. By cooperation with dairymen he has been able to reduce loss incidence attributed to this metabolic disease.

NEUROSURGERY OF THE DOG AND MAN

B. V. Favata, D.V.M., M.D.

The author explains that much knowledge of the central nervous system of man has been learned by experiments on animals. Information of value to veterinarians learned through experiments on dogs can be applied directly.

FARM MAGAZINES PROMOTE

best educational series show
(Continued from page 39)
A fox has just got to know what's going on—and he'll come to investigate. When he does, you'd better be quiet, because he can slip up, and slip away again without giving you a glimpse, if he senses you're waiting.
There are two classes of folks that hunt foxes with dogs: those that hunt to kill, and those that hunt just for the chase and the thrill of trying to unravel a fox's tricky trail.
The chances are the real die-hards of fox hunting. Some will listen all night to the hounds' bell-toned bays. Each hunter knows his dog's voice and can tell just what's happening—what tricks the fox has been up to—by the tone and excitement of confusion in the dog's baying.
When the fox decides enough's enough, he gives the dogs the slip, and the hunt ends. The dogs never catch up. To this breed of hunters, the excitement of the hunt is enough and anyone who kills a fox, or puts a bounty on them, is a mighty low creature.
Those who hunt to kill never get as strongly by that sport. They see a fox in high gear, tail floating straight behind, racing ahead of a blathering pack of dogs, you've had a thrill!
These hounds never catch a fox, either. But if you figure right—you can be in the right spot at the right time, when the hounds chase the fox by. Then the shooting starts.
To make this kind of hunting work out, you have to know the country pretty well—and most have studied foxes a lot, so going to run through it. A few chases will teach you plenty.
When you're after a fox with hounds, he'll seldom leave his range (a circle of about 3 to 10 miles in diameter). He'll run in circles, too, usually following the same paths—just under the brow of hills, through draws and gullies.
Always, the fox will be watching the hounds behind, paying most attention to what lies ahead. Most of the time he'll let the hounds keep close enough so he can see them. But sometimes, he'll be way out ahead of the hounds. That's where you can outfigure him by being more alert than he is! A fox took me by surprise one day when I was out "hunting with a camera."
The dogs were beyond a hill—I could barely hear them. I was ambling
7
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Skilled diagnosis and treatment by your veterinarian are the best livestock insurance and profit insurance you can have.
* NEVER try to guess about a disease or to "doctor" sick animals. Call your veterinarian FIRST. Save livestock, and save money.

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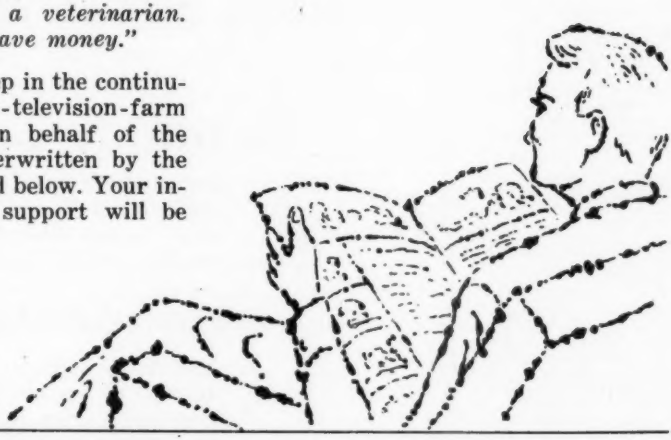
This is still another step in the continuing newspaper-radio-television-farm magazine campaign on behalf of the profession, being underwritten by the ethical companies listed below. Your interest and continued support will be appreciated.



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and more resistant to them. Because of its high order of activity against these resistant bacteria, NEOTHION controls *all known types* of bacterial mastitis with greater speed and dependability. Further, because NEOTHION contains more highly effective antibiotics, a lower dosage level can be used with the full confidence that a superior treatment has been administered.

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Triple Sulfas	▨	▨	▨	▨	▨	▨	▨	▨	
Penicillin	▨	▨	▨	▨					
Streptomycin			▨	▨	▨	▨	▨	▨	
Neomycin	▨		▨		▨	▨	▨	▨	▨
Brand A (BROAD SPECTRUM ANTIBIOTIC)	▨	▨	▨	▨	▨	▨	▨	▨	
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NEOTHION	▨	▨	▨	▨	▨	▨	▨	▨	▨

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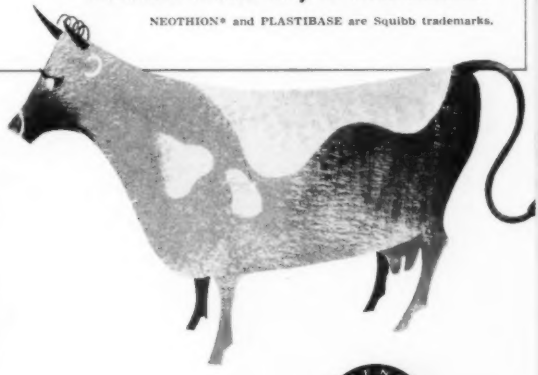

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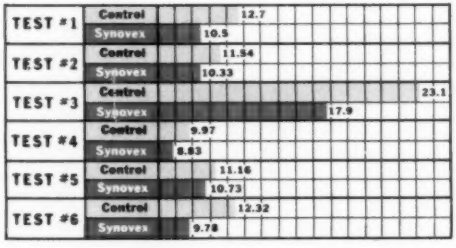
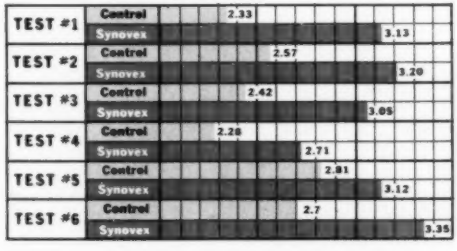


Lb. of feed per lb. of gain



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*Jones, S. V.; Belloff, G. B., and Roberts, H. D. B.: Vet. Med. 51:413 (Sept.) 1956.

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REFERENCES: 1. Bull, W. S.: N. Amer. Vet., In press. 2. Henry, R. T., and Blackburn, E. G.: Vet. Med., In press.

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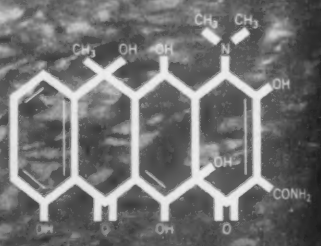

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We Americans are noted for our sense of fair play. Nowhere in the world are doubtful practices frowned on as they are here.

This is why we wonder about the distribution methods of those suppliers of veterinary products that sell for use by laymen. No doubt their sales are higher. But what are they doing to the veterinary profession?

Surely the indiscriminate use of veterinary products by untrained persons can do much to undermine *your* practice and prestige. Could this not eventually do great harm to the livestock industry as well?

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News Comment

Adequate Nutrition for Health

Nutrition as related to the maintenance of health in livestock is a subject of growing interest among veterinary practitioners. Emphasis is being given the subject at veterinary meetings in all part of the country.

Veterinary nutrition is based first on a thorough knowledge of the physiology of digestion. Other related sciences including biochemistry are basic to as complete an understanding of nutrition as facts so far revealed make possible.

Pasture Pitfalls

Pasture pitfalls unrelated to quality of pasture grasses include hazardous items resulting from improper pasture policing, according to Dr. E. J. Frick.

Poor fence repair (loose wire) is a needless cause of injury. Scrap metal left near fence repair areas may be swallowed by cattle during grazing. Poisonous plants, old battery cells, paint cans, spray vats, and fertilizer bags are common causes of illness and death of cattle or calves on pasture.

Loss of Punch

Washington researchers believe evidence is accumulating that some antibiotics are losing their growth-promotion punch. This fact may be related to development of resistant strains of harmful microorganisms.

Vitamin B Complex in Aging

Separate research report appears to confirm the theory implicating vitamin B deficiency in aging, pernicious anemia and leukemia. By measuring vitamin B in different aged groups, it is indicated that levels are higher in younger individuals. This is interpreted as representing an increased need for it by oldsters or failure of aged persons to absorb or utilize that available.

Livestock Terminal Markets

Declining importance of terminal livestock markets is emphasized in a Purdue University study which indicates that whereas 90% of cattle fed in Indiana were marketed through central stockyards in 1940, only 56% were so handled in 1955.

Other surveys have indicated this to be the general marketing trend.

Artificial Insemination

Three affidavits, one each by the owner of the stud, owner of the bitch, and the veterinarian must be forwarded with the usual application blanks to the American Kennel Club for registration of matings by artificial insemination. AKC may or may not accept the mating for registration purposes.

Farm Auction

Emphasizing urban interest in farm business, a land and cattle auction was conducted in a ballroom of a Kansas City hotel. The late Dale Carnegie's 1,240 acre ranch and 700 Brangus cattle were sold.

Part of the Bull

The current issue of Farm Journal carries a report that an Ohio artificial breeding cooperative sold semen produced by one bull in one year equal to the purchase price ($15,000) of the bull.

More Cattle on Feed

Numbers of cattle in feed lots in the 13 major feeding states totaled 12% increase over a year ago April 1, according to USDA market report.

The total, 4,896,000 head as of April 1 was only 2% below January 1 estimate, whereas the normal drop during the period is 15%. Ample feed supply and the wet corn situation is generally pointed out as responsible. Looked for break in live cattle prices during April did not occur and forecasts now suggest continued favorable price levels to extend into late summer.

Livestock Outlook

So far this year there has been considerable withholding of meat animals with expansion of inventories on farms and ranches in prospect. This applies to cattle, hogs and sheep, and is one of the few occasions that trends for all species have coincided.

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It is a combination of modified live viruses (hepatitis - porcine tissue origin; distemper-chick embryo origin) which in one injection provides living antigens against both diseases.

Most important in your consideration of CYVAC is the fact that because both virus strains of this combination vaccine are modified through serial passages in unnatural host tissue, CYVAC cannot either cause the disease or cause the dog to become a hepatitis carrier.

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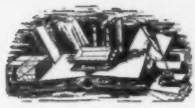
Hundreds of clinical reports  confirm the benefits of METICORTEN®
prednisone

when used as supportive therapy in the treatment of ketosis[1] and shipping fever[2] in cattle for general debility[3] and stress[3,4] in horses and for complications following castration[4,5] in swine. Pain and inflammation are quickly controlled. Appetite, strength and vigor are promptly restored.

Convenient dosage forms

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METICORTEN Aqueous Suspension, 40 mg./cc., 5 cc. vial, boxes of 1, 6, 72.
METICORTEN Tablets, 2.5 and 5 mg., bottles of 30, 100 and 1000.

Bibliography

1. Lynch, Donald J.: First Veterinary Symposium on the Uses of METICORTEN and METICORTELONE, New York, N. Y., Nov. 29-30, 1956.
2. Oberst, Fayne H., *ibid.*
3. Proctor, Delano L., Jr., *ibid.*
4. Chambers, Edward E., *ibid.*
5. Cutlip, Forrest W., and Kuhlmann, James H., *ibid.*

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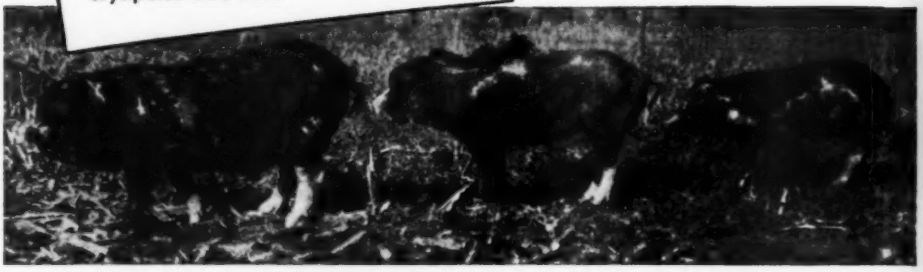

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DR. E. H. DURR

President

Dr. E. H. Durr of Jackson, Mississippi took over as president of the Southern Veterinary Medical Association at the last session, October 30, 1957. He will head the association for the 1957-1958 term.

The SOUTHERN VETERINARY MEDICAL ASSOCIATION

The spirit of the Southern was manifest again this year at Roanoke, Va. in the interest and enthusiasm of visitors in the planned scientific program. This was arranged under the capable direction of Dr. I. D. Wilson, Blacksburg, Va., chairman of the Program Committee.

In many respects the Southern Veterinary Medical Association is unique; in others it acknowledges and accepts the traditions that prevail at other veterinary conferences. It is unique in that no annual dues are accessed and members include all qualified veterinarians registered in their respective state association in the southern states extending from Texas to North Carolina represented in the S.V.M.A. But it follows traditions of state and regional meetings in providing a full schedule of scientific programs and entertainment features to which the ladies are invited.

This year's meeting, at which Dean Thomas J. Jones presided, was exceptionally well planned. Facilities at the famous Roanoke Hotel provided adequate and comfortable meeting and exhibit rooms, as well as ball rooms for the pleasurable entertainment features.

Technical Program

Most of the program material of such character as to make reproduction possible appears in this issue of VETERINARY MEDICINE. A discussion by Dr. D. K. Detweiler entitled Cardiac Arrhythmias, Heart Murmurs and Congestive Heart Failure in Dogs was published last month (*Vet. Med.*, 53:253 [May], 1958). Not all papers presented are published because of the nature of some presentations or mechanical difficulties presented by others. Those included will point up the high level of discussion of problems, and characterize the whole program.

The President's Address

Dean Thomas J. Jones

In his presidential address that opened the 40th annual meeting of the Southern Veterinary Medical Association, Dr. Thomas J. Jones, dean of the School of Veterinary Medicine, University of Georgia, Athens, referred to past history of the Association. He emphasized that the position enjoyed by today's practitioners did not come by accident, but through purposeful activities of founders and succeeding leaders.

Individual veterinarians that have passed our way have left a heritage of which we can be proud. They have eased tasks by unselfish efforts and significant contributions both to the industries served and to humanity as well. Veterinary medicine, an ancient art, is a relatively new science. Only during the past half century has it reached a respected position in the eyes of the public.

Veterinary Schools

Dean Jones commented on the lack of interest of young men in veterinary science in the second and third decade of the 20th century, and the revival of interest after the rather recent demonstration of the vital services trained veterinarians were qualified to render. These include responsibilities not only in the fields of disease control in all species of animals but in public health as well.

He spoke of the need for more and better trained professional men. Even with the increase in number of new schools established since world War II, not enough new graduates are trained to meet the needs of the nation. He suggested that inroads by lesser trained into fields of veterinary medicine will continue in inverse proportion to the success of our educational institutions to adequately train sufficient numbers to prevent upsurpation of professional duties.

Dean Jones expressed concern over some modern husbandry practices that an apathetic public appears to have disregarded. Hazards are evident in this toleration. Some of these practices have inherent public health aspects and the need for continual observation and analysis is in the public interest. In these efforts, he suggested cooperation with groups having allied interests with agriculture.

Officers for 1957-1958

Dr. A. A. Husman

Dr. E. H. Durr, Jackson, Miss., for the past year serving as president-elect, succeeded Dean Thomas J. Jones as president at the closing session.

Election of officers resulted in the selection of Dr. Clay C. Van Gremp, Decatur, Ga., as president-elect and Dr. E. E. Chambers, Chattanooga, Tenn. and Dr. W. B. Bell, Blacksburg, Va. as first and second vice presidents. Dr. A. A. Husman and Dr. M. R. Blackstock were reelected secretary and treasurer respectively.

Experience of the authors confirms the opinion that the horse is no more susceptable to peritonitis than other animals. Shock is possibly an equally important consideration in equine abdominal surgery.

Obstruction of the Colon in the Horse

E. W. ELLETT, B.Sc., D.V.M., E. W. JONES, M.R.C.V.S., Ph.D.
LESTER JOHNSON, A.S., B.S., D.V.M.

College of Veterinary Medicine
Oklahoma State University
Stillwater, Oklahoma

IN spite of the general reluctance to perform laparotomy for corrective procedures or as an aid to diagnosis in the horse, the literature concerned with equine abdominal surgery is more extensive than might be expected. Little information is available concerning actual surgery on the intestine, despite the fact that approximately 28% of all "colic" cases are said to be due to intestinal obstruction.[1] The first successful enterotomy in the equine was reported over 100 years ago by Felixet,[2] who removed a calculus from the small colon. Later, in 1895, Mac Queen[3] performed similar operations experimentally with good results. Subsequently many workers have reported successful invasion of the peritoneal cavity.[3,4,5] Observations made during the surgical correction of intestinal obstruction are reported in this paper.

Presented at the 40th annual convention of the Southern Veterinary Medical Association, Roanoke, Va., Oct. 27-30, 1957.

Diagnosis

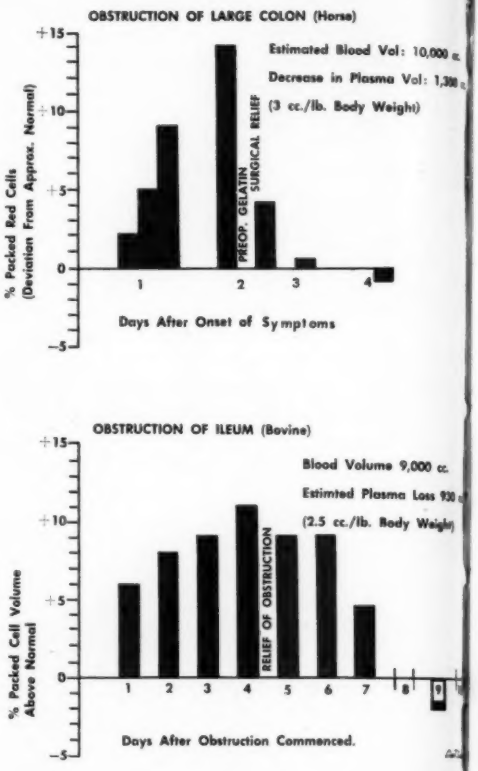
Diagnosis of intestinal obstruction of the colon in large animals is usually difficult. Confirmation prior to laparotomy by means of rectal palpation or radiography is usually not possible, although we have been able occasionally to obtain satisfactory radiographs of the abdomen of small ponies. Despite these limitations, symptoms are usually indicative of the presence of an obstruction. Initially the usual symptoms of moderate to severe abdominal pain, slightly accelerated pulse and respiration, with surpressed peristalsis are present. Mucous membranes and body temperature are frequently normal while bowel evacuations are diminished or absent. Rectal examination at this time may reveal the presence of a fecalith in the colon, but usually only slight distension of the colon with flatus is all that can be detected. In spite of treatment, the condition of the animal becomes pro-

gressively worse. The administration of laxatives or purgatives is ineffective, although it may result in the passage of flatus or a small amount of mucus. Abdominal pain persists and may increase in intensity. We have observed that Shetland ponies frequently seek relief from this pain by assuming (sometimes for several minutes) a position of dorsal recumbency. Subsequently, as the condition progresses, gas and fluid accumulate proximal to the obstruction and distension of the abdomen becomes apparent. This usually can not be reduced by trocarization, and if successful is only temporary. At the same time the pulse and respirations become accelerated, the temperature rises, the mucous membranes become severely injected, while peristaltic sounds remain absent. As shock develops, the pulse becomes weaker and even imperceptible, extremities feel cold and the animal is depressed. We feel that the prolonged absence of bowel movements, persistent pain, progressive acceleration of the pulse, severe injection of the mucous membrances, abdominal distention and in advanced cases the signs of shock are all important diagnostic signs.

After an intestinal obstruction is suspected, abdominal paracentesis may aid in confirmation of diagnosis. This is performed at the lowest point of the abdomen, using a 3-in. 18 gauge needle. Aspiration of serum-like exudate from the peritoneal cavity is indicative of the presence of peritonitis and if this fluid is blood stained prognosis is serious. The presence of food particles in the aspirated material obviously indicates rupture of the stomach or intestine.

The normal equine hematocrit reading is usually 35-40 vol. % red blood cells and any increase indicates hemoconcentration. Progressive hemoconcentration is a characteristic feature in the cases of intestinal obstruction that we have observed. This increase in the packed cell volume is so rapid that determinations made two to four hours apart are usually significantly different. This hemoconcentration is a manifestation of the onset of shock resulting from the capillary damage which results in exudation at the site of the obstruction and the accumulation of fluid proximal to the obstruction. We

CHART 1. Comparative Hematocrit Readings



feel therefore that two or more determinations of the packed cell volume at two to four hour intervals definitely aid in making a diagnosis. If the hematocrit value rises above 50% it is imperative that surgery be performed as soon as possible.

Preoperative Therapy

During the period of examination and for the period prior to laparotomy supportive therapy is essential, since success of subsequent surgery depends largely upon this treatment. It should include control of pain, fluid imbalance, shock and suppression of bacterial invasion of the peritoneal cavity from the obstructed gut. Pain is usually suppressed or controlled by the administration of 0.25-0.5 mg. per pound body weight of promazine hydrochloride (Sparine—

Wyeth), or of 0.5 — 1 mg. per pound body weight of meperidine hydrochloride (Demerol — Winthrop). The latter drug is preferred owing to its spasmolytic action. Whichever drug is used will also serve subsequently for preanesthetic sedation.

Shock is controlled by the administration of plasma expanders both prior to and during surgery. Treatment of shock is extremely important under such circumstances. An increase in the hematocrit of 10% in a 500-lb. pony indicates a loss of at least 1,500 cc. of plasma or 3 cc. per pound body weight. If such a loss is superimposed upon that which results from the laparotomy, total loss becomes considerable because 5 cc. per pound body weight or more of blood and plasma may be lost at the time of operation. We feel that 2 to 5 cc. per pound body weight of plasma expander initially is sufficient for all except cases of severe shock. More plasma expander may be required during surgery however, depending upon the degree of response to initial therapy and extent of visceral manipulation during surgery. Gelatin preparations have given satisfactory results as plasma expanders in the cases treated. Since moderate dehydration, potassium loss, toxemia and tissue breakdown often contribute to the shock phenomenon, administration of a dextrose-normal electrolyte solution is indicated. The dextrose supplies energy and facilitates the utilization of potassium which has been lost by tissue breakdown. Excessive administration of sodium should be avoided however, due to the retention associated with stress and because of the increased adrenal activity.

After an obstruction is suspected, antibiotics are administered. Either penicillin-streptomycin combinations or broad spectrum antibiotics are used. Antibiotics are indicated since they prolong life in intestinal obstruction. It has been demonstrated that massive doses of penicillin prolonged the lives of dogs in cases of strangulated obstructions of the intestine. Dogs, so treated, can be cured by intestinal resection, even after a period which is twice the survival time of untreated control dogs.[7] Our results have supported the findings of the experiments cited above.

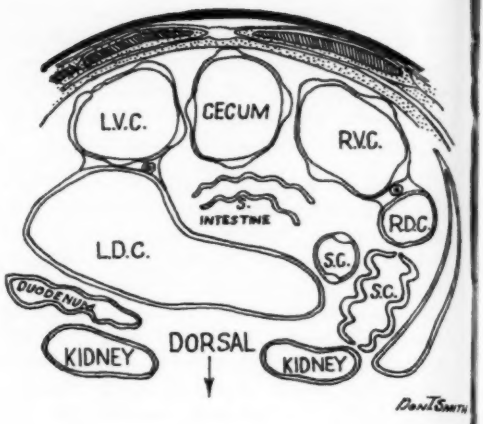
Anesthesia

Anesthesia in addition to the preanesthetic sedation with promazine or meperidine hydrochloride is necessary. It is obtained with any one of several drugs such as by the local infiltration of 2% procaine hydrochloride; by intravenous injection of a mixture containing chloral hydrate, magnesium sulphate, and pentobarbital sodium; by intravenous administration of thiobarbiturate (Pentothal Sodium — Abbott); or by an intravenous use of a mixture of thiobarbiturate-pentobarbital sodium (Combuthal — Abbott). All intravenous anesthetics are administered slowly to effect. We prefer preanesthetic sedation with promazine hydrochloride followed by intravenous administration of a mixture of chloral hydrate, magnesium sulphate, and pentobarbital sodium.

Operative Site

With the exception of the cryptorchidectomy, laparotomy for exploration of the abdominal cavity may be performed either by way of a flank, paramedian, or midline incision. The merits of various laparotomy technics in the horse have been investigated and compared by Donald.[8] He reported that a "McBurney" incision was the method of choice for operations performed in the flank region but when better exposure was essential the ventral approach through a midline incision gave the best exposure and access to most of the viscera. A paramedian incision through the rectus abdominis muscle did not give as good an exposure as the midline incision. However, it proved to be a stronger and more certain method of abdominal closure. The flank approach, we feel, has several disadvantages. Furthermore, the exposure obtained by a flank incision is not as satisfactory as that achieved through a mid-line incision. It requires restraint in lateral recumbency, thereby displacing the abdominal viscera dorsally to exert pressure on the peritoneal side of the incision. This results in excessive gaping of the incision and increases the difficulty of closure, especially of the musculature. Furthermore, the visceral exposure obtained

by a flank incision is not as extensive as that achieved by the mid-line approach. Since it is usually impossible to determine the exact location of the obstruction prior to surgery adequate exposure is essential. If the laparotomy is required only for manual exploration, then a "McBurney" incision, (Donald), in which the muscles are separated in the direction of the fibers is adequate. This type of incision is easily closed, but it does not permit good exposure, is often inadequate for many corrective procedures, and is difficult to enlarge. A mid-line incision gives equal exposure to either side of the abdomen, no muscles are severed, it can be enlarged without difficulty, and it is easily closed. Some surgeons believe that the mid-line incision is likely to break down due to the weight of the abdominal viscera, but we have not encountered this difficulty. In the male, however, a paramedian approach is used when the posterior abdominal region is to be explored.



Cross section through lower abdomen of a horse: L.V.C. — left ventral colon; L.D.C. — left dorsal colon; R.V.C. — right ventral colon; R.D.C. — right dorsal colon; S.C. — small colon; others self explanatory.

Restraint and Position

In using the mid-line incision it is necessary to restrain the animal in dorsal recumbency. Exploration of the posterior abdomen is facilitated by elevating posterior parts.

Surgical Procedure and Findings

After the operative field is clipped, washed and disinfected, sterile drapes are applied and a 12 in. to 18 in. incision is made through the skin. Hemorrhage is controlled and sterile drapes are applied to the skin edge. The incision is now continued through the linea alba until the peritoneum is exposed. This is picked up and incised. In some animals a thick layer of subperitoneal fat may be troublesome. As soon as the peritoneal cavity is opened, the cecum which is usually distended with gas in cases of obstruction of the colon protrudes through the incision. A large sterile needle is inserted into the cecum, which permits gas to escape and improves access to the abdominal viscera.

The site of the puncture may require closure to prevent leakage of intestinal contents. The abdominal cavity can now be explored and the obstruction located by palpation. Distention of the gut with gas and fluid proximal to the obstruction assists in locating the lesion. The obstructed gut is then delivered through the incision. If the obstructing mass is not too firm, it may be broken down by massage. Caution should be used in this procedure for the intestine itself may be easily damaged. If it is not possible to disperse the mass in this manner, then the obstruction should be isolated by means of intestinal clamps and the area packed off with sterile towels to prevent contamination of the surrounding viscera. An enterotomy is then performed and the mass removed. The obstructions we have encountered have been due to pseudo-enteroliths (a firm, impacted ball of fecal material) which were usually located in the proximal part of the small colon. The intestine is cleansed with sterile saline solution and the incision closed with a double row of continuous sutures using 00 chromic catgut. Any of the usual bowel sutures could be used. The exposed intestine is cleansed once more and replaced in the abdominal cavity. The laparotomy incision may be closed in numerous ways. We

usually use three rows of sutures, the first in the peritoneum, the second in the linea alba, and the third in the skin. Whatever technic is used it should be remembered that the strength of the suture line depends upon the number of sutures inserted rather than the size of the material, providing this material is as strong as the tissues in which it is used. It is therefore important to insert a sufficient number of sutures.

Postoperative Care

When the operation has been completed all restraint is removed from the animal and it is allowed to remain in lateral recumbency until it is able to rise with minimum assistance. Removal of restraint helps to eliminate the struggling associated with the recovery stage of anesthesia.

When at least 12 hours have elapsed since surgery the animal is given a light diet of bran and a small amount of native grass hay. During the next seven to 14 days, food is gradually adjusted until the animal is again receiving a normal diet. The owner is instructed that the animal should not receive coarse feed at any time.

In view of the danger of possible contamination a postoperative course of antibiotics (usually penicillin and streptomycin) is given. However, like Marcenac,[4] we do not believe that the peritoneum of the horse is more susceptible to infection than that of other domestic animals. On the other hand it is possible that the horse is more susceptible to shock. Traumatic edema, with loss of plasma into the extravascular space, is common in this species. It is therefore conceivable that post-traumatic hemoconcentration will develop more rapidly in this species than in other animals under similar circumstances. The speed at which the hemoconcentration develops in cases of intestinal obstruction in the horse as compared with a similar lesion in cattle supports this contention. Therefore the prophylaxis and control of shock can not be overemphasized.

Results

During the last 18 months, 11 cases of intestinal obstruction have been admitted to this clinic. These included two cases of obstruction of the large colon at the pelvic flexure, one case of gangrene of the cecum, and eight cases of obstruction of the small colon. Two animals died prior to surgery, nine underwent surgery and of these, six made uneventful recoveries and the remaining three died. One death was due to rupture of the colon as a result of trocarization prior to admission, another to severe infarction of the kidneys (along with peritonitis) and the other to multiple intestinal infarctions secondary to a mesenteric aneurysm.

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Ovine Vibriosis

When an unusual number of abortions and weak lambs occur in the flock, vibriosis should be suspected.

A positive diagnosis is based on history of the outbreak and recovery of infective organisms from cotyledous, vaginal discharge of ewes, or aborted fetuses. If fresh aborted fetuses are available, the organism usually can be recovered in pure culture from the liver, heart, or contents of the gastrointestinal tract. Blood agglutination tests have proved to be of little value in establishing diagnosis of this disease.

Repair of Umbilical Hernia in Swine

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UMBILICAL HERNIA frequently presents a surgical problem in swine practice. Anatomical consideration make for attendent difficulties in both sexes, but are most complicated in males.

Various short cuts, such as the use of clamps, et cetera, are unsatisfactory, especially in barrows.

The described technic has been used with uniform successful results in approximately 40 cases, including both sexes, with hernias of varying sizes.

Surgical Technic

In small pigs, a local anesthetic is used. In larger hogs, pentobarbital sodium is injected via the ear vein to effect.

Animals are restrained dorsally on an inclined V-shaped trough with the head lowered.

The skin is prepared with a suitable defatting agent and antiseptic. In the small pig, a logitudinal incision (1 to 2 in.) is made through the skin and subcutaneous tissue lateral to the hernial sac on either side. In the case of an extensive hernia, the incision is enlarged correspondingly. If there is displacement on the sac from the median place, incision is made on the side opposite displacement.

The skin and fascia are then dissected from the hernial sac and moved medially so that the incision is now over the hernial ring. The hernial sac is then incised near the median plane. Contents of the sac are freed of any adhesions and replaced. The sac proper is removed and the ring sutured with mattress sutures using chromic catgut, size 2 to 4, depending on the size of the animal.

The superficial tissues are then allowed to return to their proper position laterally; the skin and subcutaneous tissues are next sutured with mattress sutures using catgut. If the incision is over 2 in. in length, umbilical tape is employed. Smear 62 is applied. Tape sutures are removed in seven to ten days. If the sac is extensive, trimming of tissues is necessary to eliminate any "pouching" effect.

This operative technic offers several important advantages over most methods now in use. The superficial incision is much smaller than an eliptical incision around the prepuce. By moving the incised superficial tissue medially to complete the operation, the two sutured opening are several inches apart, lessening the chance of prolapse of abdominal contents or of deep penetration of superficial infection or screwworms. The technic can be adapted to other types of abdominal operations.

Tetanus in Lambs

A prominent Kansas veterinarian has demonstrated that tetanus is always a potential possibility following tail docking and emasculation of lambs. Satisfactory prophylaxis is provided by administration of 1 cc. of a dilution, 1 cc. of tetanus toxoid in 4 cc. of distilled water. Each lamb receives 0.25 cc. of the active toxoid as a dose. Diluted toxoid is dispensed to those sheepmen who do their own lamb docking and castrating.—*R. R. Dykstra, D.V.M.*

During recent years, the two diseases of cattle discussed here have increased in seriousness in the South. Possible exciting causes are pointed out with recommendations for management.

Green Oats Intoxication and Icterogenic Photosensitization in Cattle

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GREEN oat grazing producing tetany or toxicity in cattle has become a major disease problem in the southern states. Consideration has been given the disorder in the past. Some of the basic responsible factors revealed by recent experiences are reported.

Fruitful research has not yet entirely revealed all that is apparently involved in the etiology of green oat tetany. Previous views included the suggestion that high nitrate fertilization upset mineral balances of forage with the results that blood calcium and magnesium deficiencies developed. Another theory expressed was that increased fertilization raised soil potassium content to a point where this element was increasingly available to plants and animals. Absorption of excess potassium lowered blood values of calcium and magnesium. The latest theory originated in England. In this it is theorized that when cattle graze green oat pasture, there accumulates an excess of ammonia in the rumen. The excess of ammonia prevents complete absorption of magnesium and calcium leading to tetany.

Personal opinion would not favor high nitrate fertilization as a basic cause. In experimental work conducted at Auburn, cows have become sick on low nitrogen fertilization as well as on highly fertilized pastures. Excess ammonia in the rumen may be confirmed, but the basic factor of why some oat grazing is toxic and other similar fields non-toxic is not understood. In the winter of 1957, a vicious outbreak of oat tetany was observed in Mississippi. The outbreak involved 800 animals with a

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Fig. 1. Severe lesions of icterogenic photosensitization in unpigmented skin areas over the withers.

final mortality of approximately 100 cattle. The viciousness of this outbreak could be explained on the basis of a borderline deficiency in the cattle and a low mineral content of the soil on which the oats were growing. Other herds were noted as having the same factors involved and causing high morbidity and mortality.

Case History

The history of the Mississippi herd included the statement by the owner, that in spite of feeding minerals his cows did not do well on fall grazing. Checking revealed that the supposed mineral mix was a pelleted supplement containing trace elements. Oat grazing was planted in a rotation following cotton. When the cotton acreage was prepared, 600 lb. of 6-8-8 fertilizer was applied per acre. At planting time 400 lb. of 14-14-14 per acre was drilled. Some cotton plots received 100 lb. potash to the acre, others did not. Before plowing for oat seeding 2,000 lb. of lime per acre was applied. All oat fields were sidedressed with anhydrous ammonia. The fertilization may seem adequate but for cotton and oat rotation, it was considered slightly low. Analysis of soil samples from the oat pastures were as follows:

Sample	Ph	Avail. Ca. (p.p.m.)	P205 (p.p.m.)	K_2O (p.p.m.)
no. 1 (100 lb. potash added)	5.2	544	39	66
no. 2 (no potash)	4.7	536	15	26

The Ph of both soils were acid. They are relatively low in calcium for this type of soil and would also be expected to be relatively low in magnesium. Samples from field no. 2 would very likely be lower in magnesium than those from no. 1, since no. 2 is the more acid area.

During the outbreak losses were confined to fresh cows or lactating cows. Blood samples taken from normal cows and steers revealed on chemical analysis:

Calcium	9.0	to	11.5	mg. %
Phosphorus	4.8	to	7.6	mg. %
Magnesium	1.42	to	2.56	mg. %

On sick animals or those which had been treated, chemical analysis of blood revealed:

Calcium	5.9	to	11.0 (average 7.5)	mg. %
Phosphorus	7.6	to	10.5	mg. %
Magnesium	0.51	to	1.28	mg. %

Experimental work conducted by Dr. C. S. Roberts and associates of the Alabama Polytechnic Institute indicates that when cows are grazed on oats that have a tendency to produce toxicity, a definite cycle involving the blood chemistry occurs. This cycle ends in values of calcium, phosphorus and magnesium similar to the analysis of the blood of the affected animals previously quoted. When cattle were placed on experimental plots of oats and blood analyses were periodically made, it was found that there were gradual diminishing values for calcium and magnesium so that at approximately 30 days of grazing calcium had decreased from 10 mg. % or 12 mg. % down to 5 mg. % or 6 mg. %. Magnesium also had decreased from a normal value of 3 mg. % to a range in the danger zone which is around 1 mg. %. In mineral deficient

animals the cycle may cover only three weeks. When cattle with low values were removed from oat pasture and placed on hay, calcium and magnesium values rapidly returned to normal, usually in four days.

In view of the above facts, what can the veterinarian do in the prevention of oat tetany? Preventive measures that should be advocated include:

1. Supply a good mineral mix to cattle during fall grazing previous to oat grazing.

2. A planned program of soil fertilization of oat pastures to provide adequate calcium and magnesium in the soil and plants.

3. A rotation system of grazing oat pastures to avoid dangerous low calcium and magnesium blood values. Such rotation would include three weeks of grazing on oats and one week in another type of pasture or in a lot when hay and supplements may be fed.

4. Minerals should be available free choice in oat pastures even though little is consumed.

Fig. 2. Icterogenic photosensitization. Note skin necrosis and slough on dewalp.

The above recommendations have been used with success in some herds. Some modification may have to be made in herds where a borderline mineral deficiency exists.

Icterogenic Photosensitization

A second problem prevalent the past year and prominent in many previous years, is icterogenic photosensitization of cattle. The disease tends to be seasonal and more prevalent in some years depending on climatic conditions. Heavy rains and good growth of forage in early 1957 produced conditions favorable for one type of the syndrome. Icterogenic photosensitization as a problem of cattle in the South comes about in two ways. One type follows the frosting of pastures containing mostly Bermuda grass. This type has been observed in Florida, South Georgia and Texas. Following one or two severe frosts, Bermuda grass becomes like dried hay and matts down into a dead mass. When frosts are followed by rain and warm weather the dead pasture grass moulds and in about four to six weeks new grass or sometimes winter clover will come up through the old grass. Such pastures when grazed may produce icterogenic photosensitization. Such photosensitization is apt to occur during the months of December, January and February.

A second type of icterogenic photosensitization has produced considerable economic loss in early summer. This type has followed the end of the winter grazing season especially when winter pastures were crimson clover or white dutch clover with Bermuda grass replacing the clover as summer grazing. Climatic conditions favorable are usually drought followed by a period of warm rains. In 1957, photosensitization followed torrential rains and a period of warm growing weather.

The sequence of etiological events is similar in all cases. When Bermuda grass or clover are damaged by frost or drought, or if clovers are beaten down shortly after the seed stage, there is a tendency for the dead forage to matt and mould. In the period of moist, warm weather, moulds by

their action on the plants render the forage toxic. The toxic forage contains an icterogenic substance which damages the liver and prevents the elimination of bile and phylloerythrin. The new grass coming through the dead grass furnishes much chlorophyl in the diet. The old grass also contains broken-down chlorophyl products. When chlorophyl is taken into the small intestines of a cow it is normally converted to phylloerythrin. Phylloerythrin is eliminated by the liver in the feces. When the hepatotoxin contained in damaged forage affects the liver so that bile and phylloerythrin can not be properly eliminated, the affected animal becomes icteric and the absorption of phylloerythrin into the blood stream sensitizes the animal to sunlight.

Early Symptoms

The earliest noticeable symptoms of icterogenic photosensitization in cattle are a dejected appearance combined with excessive drooling, sometimes lacrymation and usually diarrhea. Later the animal licks itself, switches the tail, and shakes the head as though flies were bothering it. Many show violent head shaking and rub the head on fence posts or wire fence. They sometimes scratch the horns and poll with one of the hind feet. In milking cows, the onset is usually ushered in by a drop in milk yield. The udder and teats of milk cows may first show irritation by attempts on the part of the cow to lick or kick the parts.

Lesions

Lesions of photosensitization usually appear on the second day. There is a burned appearance of the muzzle, nostrils and eyelids. There is inflammation of the undersurface of the tongue probably caused by photodynamic action occurring during exposure to sunlight due to the frequent licking of nasal discharge. Exfoliation appears on the ears, the anus and vulva, and the flank, and marked dermatitis appears on the udder and teats. White areas are chiefly affected, but thin skinned or tender areas even though pigmented will peel. Ears, base of the horns, back, rump, and tail may show considerable necrosis even in dark animals. Icterus can be detected in the early stages. Urine frequently appears dark, reddish brown. Deaths may occur before lesions of photosensitization are evident. The mortality varies in different outbreaks from 2 to 10%. Heaviest mortality is apt to occur in cows in advanced pregnancy where stress and some fatty infiltration of the liver may already exist.

Education and Control

Control of icterogenic photosensitization depends on education of cattle owners concerning the condition and early treatment. The following measures have been advocated.

1. Transfer cattle to other pastures when conditions are favorable for the development of an icterogenic substance in the grazing plants.

2. Mow or burn suspected pastures to remove deteriorating forage. Harrowing dead matted grass to expose the underlying mould to the sun may be effective.

3. Apply 100 to 200 lb. of sodium or ammonium nitrate per acre to promote fast growth of succeeding grasses.

4. Allow new grass to approach a height of 6 to 8 in. so as to avoid grazing of dead mouldy grass.

5. Prevent overgrazing. Supplemental feeding to prevent overgrazing.

6. Remove animals to dry lot and other pastures at first signs of photosensitization, and effect early treatment of animals with sodium thiosulfate. Reagent grade sodium thiosulfate is administered intravenously in 30% solution at the rate of 1 oz. (30 gm.) per 100 lb. of body weight.

The practitioner's problem in the medical management of infected herds or those threatened is to advise on practical methods of control and eradication. In this paper a method of evaluating the protective value of blood serum against an active challenge is presented and a procedure that could be used to evaluate resistance to infection after disappearance of demonstrable antibodies.

Leptospira Vaccine Evaluation

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SINCE the first recognition of leptospirosis as an economic factor in American livestock production, many surveys have been published from every part of the country and much factual data has been collected. The evidence of infection, the variation in host reaction, the host-carrier problem and the interpretation and correlation of serological findings to the herd problem, makes this disease a practitioner's problem. The herdsman's problem is to avoid economic loss; the practitioner's is to be in a position to advise on practical methods of control and eradication. This will certainly involve a history and clinical knowledge of the herd, in order to advise on the basis of serological findings. Is the disease a recent infection and explosive, or a latent infection clinically observed only in natural increase and purchased additions? Serological methods old and new are available to determine the demonstrable antibody *in vitro*. The agglutination-lysis test as used in many laboratories is a reliable index, although as stated by Stoenner[1] "so many modifications have been introduced that few workers follow exactly the same method." Stoenner has stated some of the variations:

1. The variation in length of time and temperature of agglutination-lysis tests.

2. The concentration of Leptospira organisms in the antigen attributed to either dilution of the growth and/or variability of growth in various media.

3. The growth time of the antigen.

4. Strain variation.

5. The effect of varying dilutions of serum on titers.

Of these variables Stoenner considers the bacterial cell concentration in the antigen and the variability of dilution technic as the two most important. He states that tests with antigens of low cell count yield higher titers than tests with antigens containing a heavy concentration of Leptospira. The use of antigens diluted between 1:4 to 1:8 resulted in end points about five-fold greater than titers obtained with undiluted antigens. The geometric mean titer of sera

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examined in ten-fold serial dilutions was about four times greater than of sera examined in two-fold serial dilutions. (This is attributed to serum carryover in the conventional method of titrating sera.)

Stoenner further states: "Unfortunately, some workers have placed too much emphasis upon the significance of low titers. These individuals apparently disregard the possibility of nonspecific reactions and they consider titers of 1:10 in the agglutination-lysis test or 1:4 in the complement fixation test as reflecting previous experience with the serotype in question. Based on such criteria, serological surveys have revealed an amazing prevalence of leptospirosis among domestic animals; epizoological studies of herds surveyed would probably have revealed a much lower prevalence of the disease."

Low titers may be nonspecific, therefore, end point serological titrations should be completed and evaluated on a herd basis and compared to serological reactions in active outbreaks and convalescent herds.

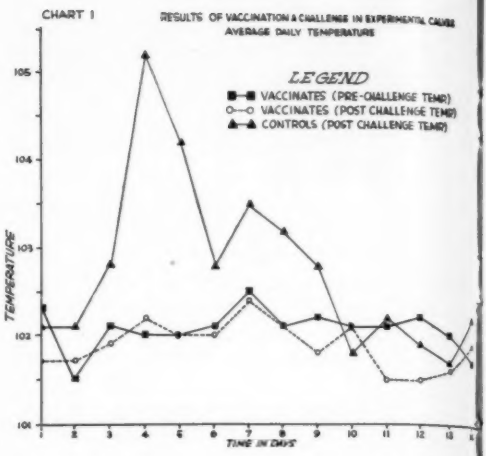
In this paper a method of evaluating the protective value of serum against an active challenge is presented, and a procedure that could be used to evaluate resistance to infection after the disappearance of demonstrable antibodies.

Serological Procedures

The comparative agglutination-lysis tests in this report are standard for these tests, and based upon two hours water bath incubation at 37 C. and complete agglutination or/and lysis at the end point, with viable organisms in the next higher dilution comparable to the control tubes. The higher than usual titers are undoubtedly due to fewer organisms in the Leptospira antigen, however, it was felt that a clear-cut end-point eliminated the human element of interpreting, *e.g.* 50% still viable organisms.

The new standardized antigens and procedures as reported by Stoenner,[3] York,[3] Bryan[4] and Howarth[5] should tend to simplify and standardize serological tests for busy diagnostic laboratories.

Serological procedures show the demonstrable antibodies stimulated by either vaccine or natural infection. It has been demonstrated by many workers that the vaccine does not stimulate as high an antibody titer as natural infection, however, it has been shown that the vaccine response will protect against natural infection and retard the spread of the disease in recently infected herds. In some animals the antibody titer recedes or may disappear in a few weeks, but the animal is still resistant to the disease.



The value of a serological report should be interpreted according to the clinical picture of the herd, *e.g.*, a recent infection interpreted upon two or more serological tests on the same animal which should show increasing titer. While these serological tests show contact with Leptospira either recent or chronic they do not evaluate the ability of the animal to resist the infection, especially a low descending or vaccine titer, which could be confused with a nonspecific reaction. In further discussion and illustrations, an effort will be made to serologically evaluate some Leptospira vaccines, discuss virulence for hamsters, hamster protection tests and to correlate these with serum titrations, and challenge tests in hamsters.

Experimental Work

In experiment 1, 19 Hereford calves weighing 600 to 800 lb. each were purchased from a farm free of leptospirosis as shown

by the history of the herd and completely negative serological tests. These animals were placed in isolation and observed for two weeks, during which temperature reactions and clinical observations indicated that they were healthy, normal calves. They were designated by ear tag numbers into four groups as shown in table 1. Numbers 77, 78, 81, 87 and 88 received 5 ml. of lot 6 vaccine which contained 470 x 10^8 organisms per ml.; and numbers 82, 83, 84, 85 and 86 received 5 ml. of lot 8, containing 590 x 10^8 organisms per ml.; and numbers 79, 89, 90 and 91 received 2 ml. of lot 10 vaccine, containing 630 x 10^8 organisms per ml. adsorbed on aluminum hydroxide. Numbers 92, 93, 94, 95 and 96 were left as controls.

All vaccines were broth cultures grown in modified Stuarts media with the addition of rabbit serum. The vaccine and challenge strains were supplied through the courtesy of Dr. James A. Baker, Cornell University, Ithaca, N. Y.

All animals were vaccinated on June 19, 1956, and all groups including the controls challenged on July 9, 1956, with 2 ml. of 10% virulent hamster tissue consisting of liver, spleen and kidney tissue. It has been the experience of this laboratory that fresh hamster tissue harvested shortly after death or euthanasia is much more consistent and virulent challenge than broth culture. This tissue will consistently kill hamsters using 0. 1 ml. intraperitoneally at a dilution of 10^{-5} or 10^{-6}. This is at variance with a broth culture challenge which will vary with the age of the culture and the number of broth passages. Virulent hamster tissue (0. 1 ml. of 10% dilution — presence and approximate number of organisms determined by darkfield microscopy) will consistently kill hamsters on the fourth day. A broth culture obtained by venipuncture on the second or third day following hamster inoculation, grown in modified Stuarts media, will gradually lose its lethal qualities as shown by time of exposure, and inconsistent deaths. It frequently will be necessary to make blind hamster passages in order to renew and standardize the challenge. Throughout these experiments it is felt that the use of hamster tissue has provided a uniform virulent challenge, and the consistent results are attributed to this standardized virulent challenge.

Table 1 and Graph 1

All vaccinated calves showed a gradual but low increase in titer for a period of 21

TABLE 1. Results of Vaccination and Challenge in Experimental Calves
Agglutination-Lysis Titration

Calf no.	Group	Pre-immun. Titer June 19		Post Vaccination Titer June 25	July 2	July 9	Post Challenge Titer July 12	July 16	July 19	July 24
77	VACC.		neg.	1: 50	1: 50	1: 50	1: 50	1: 250	1: 1,250	1: 1,250
78			neg.	50	50	50	50	250	250	1,250
79			neg.	<50	250	250	250	250	250	1,250
81			neg.	50	50	250	250	250	1,250	1,250
82			neg.	<50	50	250	250	250	1,250	1,250
83			neg.	<50	50	50	250	6,250	6,250	6,250
84			neg.	<50	<50	50	50	781,250	781,250	781,250
85			neg.	<50	<50	50	50	250	250	1,250
86			neg.	50	50	50	50	250	1,250	1,250
87			neg.	<50	<50	50	50	250	1,250	6,250
88			neg.	<50	<50	<50	50	250	1,250	6,250
89			neg.	<50	50	50	250	1,250	31,250	31,250
90			neg.	<50	50	50	50	250	1,250	1,250
91			neg.	<50	50	250	250	1,250	1,250	6,250
92	CONTR.		neg.	nr	nr	<10	*31,250	781,250	781,250	1,000,000
93			neg.	nr	nr	<10	*31,250	781,250	781,250	1,000,000
94			neg.	nr	nr	<10	*156,250	1,000,000	1,000,000	1,000,000
95			neg.	nr	nr	<10	<50	781,250	1,000,000	1,000,000
96			neg.	nr	nr	<10	<50	56,250	1,000,000	1,000,000

*On each post challenge bleeding date 0.5 ml. of blood from each animal was injected into one hamster. Positive isolations are indicated.
Vaccinated — June 19, 1956. Challenged July 9, 1956 with 2 ml. of a 10% virulent hamster tissue (1,000,000 plus hamster M.L.D.'s).
No. 77, 78, 81, 87 and 88 vaccinated with 5 ml. of lot 6.
No. 82, 83, 84, 85 and 86 vaccinated with 5 ml. of lot 8.
No. 79, 89, 90 and 91 vaccinated with 2 ml. of lot 10 (aluminum hydroxide adsorbed).

TABLE 2. Bacterial Count, Hamster Titration and Challenge of *L. Pomona* Vaccine Lots 6, 8 and 10

		Vaccinated with 1 ml. of respective dilution subcutaneously						
		1:8	1:16	1:64	1:128	1:512	Controls	
Lot no. 6	470×10^8	4/4	4/4	4/4	4/4	—	0/4	Survivors/Challenged
	Vaccinated with 1 ml. of respective dilution subcutaneously							
8	590×10^8	4/4	4/4	4/4	3/4	2/4	0/4	Survivors/Challenged
	Vaccinated with .4 ml. of respective dilution subcutaneously (aluminum hydroxide adsorbed)							
10	630×10^8	4/4	4/4	4/4	4/4	2/4	0/4	Survivors/Challenged
	Challenged with 0.2 ml. 10^{-1} hamster tissue (10,000 + hamster m.l.d.'s.)							

days prior to challenge, and with the exception of 84 and 89 a low challenge titer. Neither of these two animals exhibited a post challenge temperature reaction. On each post challenge bleeding 0.5 ml. of blood from each animal was injected into one hamster. Isolations were made from numbers 92, 93 and 94 at the peak of the temperature rise as indicated on chart 1. The organism was not isolated from numbers 95 or 96, however, the agglutination-lysis table shows a somewhat slower response and it was felt that if daily bleedings had been taken the organism could have been isolated during the course of the thermal response. The difference in the final titers of vaccinees and controls conforms to reports of various workers.

Table 2

A method of measuring the actual protection conferred by a vaccine is illustrated in table 2. Four hamsters were vaccinated

TABLE 3. Results of Vaccination and Challenge in Experimental Swine

Hog no.	Group	Pre-immun. Titer	Post Vaccination Titer			Post Challenge Titer		
		August 14	August 20	August 27	September 5	September 11	September 18	October 8
226	VACC.	1: neg.	1: <10	1: <10	1: 10	1: <10	1: 10	1: 10
227		neg.	<10	<10	10	100	100	1,000
228		neg.	<10	<10	10	10	10	100
229		neg.	<10	<10	<10	100	100	100
230		neg.	<10	<10	<10	<10	10	100
231		neg.	<10	<10	<10	<10	100	1,000
232		neg.	<10	<10	<10	<10	10	100
233		100	100	100	100	100	100	100
234		neg.	<10	<10	<10	<10	100	1,000
235		1,000	1,000	1,000	1,000	1,000	1,000	1,000
236		neg.	<10	<10	100	100	100	100
238		neg.	<10	<10	<10	<10	10	100
239		neg.	<10	<10	<10	10	10	1,000
240		100	100	100	100	100	100	100
247		neg.	<10	<10	<10	<10	100	1,000
248		neg.	<10	<10	<10	10	10	100
249		neg.	<10	<10	<10	<10	100	1,000
250		neg.	<10	<10	<10	<10	100	1,000
251		neg.	<10	<10	<10	10	100	10,000
252		neg.	<10	<10	<10	<10	10	10,000
241	CONT.	neg.	<10	<10	<10	10	1,000	10,000
242		neg.	<10	<10	<10	10	100	1,000
244		neg.	<10	<10	<10	100	100,000	1,000,000
245		neg.	<10	<10	<10	100	10,000	100,000
246		neg.	<10	<10	<10	10	10,000	1,000,000

Vaccinated — August 14, 1956. Challenged September 11, 1956, with 1 ml. of 10% virulent hamster tissue, hamster titration greater than 100,000 hamster m.l.d.'s.
Vaccinated with 5 ml., lot 6. Count was 470×10^8 per cc., no. 226, 227, 228, 229 and 230.
Vaccinated with 5 ml., lot 8. Count was 590×10^8 per cc., no. 231, 232, 233, 234, 235, 247, 248 and 249.
Vaccinated with 2 ml., lot 10 (aluminum hydroxide adsorbed) 630×10^8 per cc., no. 236, 238, 239, 240, 250, 251 and 252.

subcutaneously with 1 ml. of the respective dilutions of vaccine 6 and 8 and 0.4 ml. of lot 10 as shown on this chart. Fourteen days postvaccination they were challenged with 0.2 ml. of a 10% hamster tissue which is in excess of 10,000 hamster m.l.d.'s. as shown by the challenge titration. The number of hamsters immunized is designated by the denominator and the survivors following challenge, by the numerator. These tests would indicate that Leptospira produce an exceptionally potent immunizing antigen. Not only are the survivors consistent, the antigen immunizes some hamsters at a dilution as high as 1:512 against an extremely heavy challenge.

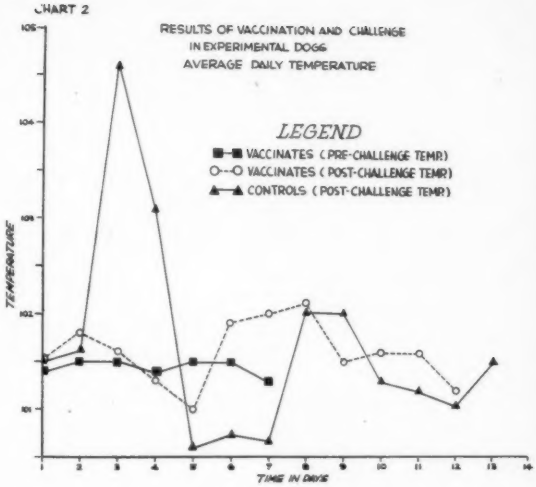


Table 3 and 4

Swine are less consistent in their response to vaccination and challenge as is shown in table 3. Group of pigs tabulated were selected from a herd with no apparent evidence or history of Leptospira infection. They were raised on the Research Farm as a group, with no attempt at separation either pre or postweaning. It was therefore surprising to find three positive pigs out of this group upon primary test; while the remainder were negative at all dilutions. Repeated tests did not change this picture. It was equally surprising that the titer of these three did not change throughout the vaccination and challenge period. If agglutination-lysis titer is to be considered as a vaccination or infection indicator, it would have to be evaluated, at least in this case, on the entire herd as well as clinical interpretations. These and other serological results prompted us to consider the possibility that demonstrable antibodies might not indicate the protection afforded by a vaccine. Table 5 illustrates a method of evaluating the animal's resistance to infection.

Six pigs were selected for serum titration and pooled into three groups because of the volume of serum required for the test and that available. The prevaccination sera from pigs number 226 and 227 which were negative to the agglutination-lysis test; control pigs number 244 and 246, which after challenge at the last bleeding revealed titer of $1:10^6$ and pigs number 229 and 230 titer less than 1:10 at the prechallenge bleeding. The serum in dilutions of 1 ml., 0.5 ml., 0.25 ml., and 0.1 ml. was injected intraperitoneally into two hamsters for each dilution and challenged in approximately 24 hours with 0.2 ml. of 10^{-3} virulent hamster tissue suspension (100 + m.l.d.'s.). The results of this titration are reported in this table. All hamsters immunized with the negative serum died. Hamsters protected with the serum from the control pigs, titer $1:10^6$ were

TABLE 4. Titration of Swine Sera in Hamsters

Pigs no.	1 ml.	0.5 ml.	0.25 ml.	0.1 ml.	
226-227	0/2	0/2	0/2	0/2	Survivors/Challenged
244-246	2/2	2/2	2/2	0/2	Survivors/Challenged
229-230	2/2	2/2	2/2	2/2	Survivors/Challenged

Pigs 226-7 pre-vaccination sera — Agglutination lysis negative
Pigs 244-6 control pig sera — agglutination lysis titer 1:1,000,000
Pigs 229-30 vaccinated pig sera — agglutination lysis titer 1:10
Serum injected intraperitoneally — challenged in approximately 24 hours with 100 + m.l.d.'s. (0.2 ml. — 10^{-3} hamster tissue.)

TABLE 5. Hamster Titration — *L. Canicola* Vaccine 8

1:8	1:16	1:64	1:128	1:256	1:512	
3/3	3/3	3/3	1/3	1/3	0/3	Survivors/Challenged

Challenge 100,000 + M.L.D.'s.

protected with 0.25 ml. of serum but not with 0.1 ml. of serum. Hamsters protected with the vaccinated pig sera having titer 1:10 survived at all dilutions, including 0.1 ml.

Table 5 and 6 and Graph 2

In view of the fact that canine litters could be secured and readily handled it was decided to try and duplicate this work in dogs. Four litter mate dogs approximately five months of age were used in this experiment. Table 5 illustrates the hamster protection test on this vaccine.

Table 6 illustrates the agglutination-lysis titration of four litter-mate dogs; numbers 1 and 2 dogs vaccinated with 1 ml. of *L. canicola* vaccine, lot 8 and challenged with 0.5 ml. of 10% virulent hamster tissue (approximately 250,000 hamster lethal doses). The titer on the vaccinated dogs increased gradually and was not materially affected by the challenge, whereas the controls following challenge experienced a rapid uniform increase in titer. The temperature reaction is illustrated in graph 2. Whereas the temperature of the vaccinated dogs remained normal, the control dogs temperatures increased to 104 F. and 105.2 F. on the second day. *L. canicola* was isolated from the blood of these two dogs in hamsters on the second day after challenge at the peak of the temperature rise. The control dogs showed a transient anorexia and congested mucous membranes during the febrile reaction, however, because it was not the purpose of this project to evaluate clinical results, they were not kept for observation, but discarded at the completion of this experiment.

Table 7

Table 7 illustrates the progressive protection afforded by vaccine as illustrated by the titration of canine sera in hamsters. Six litter mate pups were selected for this experiment; three vaccinees and three controls. They were vaccinated Feb. 28, 1957 with 2.5 ml. of *L. canicola* vaccine lot 8 and challenged Mar. 21, '57 with 0.5 ml. of 10% virulent hamster tissue. The serum was pooled from each group of dogs and titrated as indicated in the chart.

Initially in the vaccinated and control group of dogs the pooled sera of each group did not protect hamsters. The sera of the control dogs did not give protection until challenged, whereas the vaccinated dogs demonstrated a progressive increase in ability to protect hamsters which apparently was enhanced by the challenge, or due to the increased time factor.

TABLE 6. Results of Vaccination and Challenge in Experimental Dogs Agglutination-Lysis Titration

Dog no.	Group Pre-immun. titer Sept. 10/56	Post-Vacc. titer Sept. 19/56	Challenged** Sept. 26/56	Sept. 28/56	Post Challenge Titer Oct. 2/56	Oct. 5/56	Oct. 9/56	Oct. 15/56	Oct. 23/56
1	Vacc. neg.	1: 10	1: 10	1: 1,000	1: 1,000	1: 1,000	1: 1,000	1: 1,000	1: 1,000
2	neg.	10	100	100	100	1,000	1,000	1,000	1,000
3	Contr. neg.	neg.	neg.	*neg.	10	10,000	100,000	1,000,000	1,000,000
4	neg.	neg.	neg.	*neg.	10	10,000	100,000	1,000,000	1,000,000
Control positive serum		1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Control negative serum		neg.	neg.	neg.	neg.	neg.	neg.	neg.	neg.
Saline control		neg.	neg.	neg.	neg.	neg.	neg.	neg.	neg.

*0.5 ml. of blood from each animal was injected into one hamster. Positive isolations are indicated.
**Challenged September 26, 1956, with 0.5 ml. of 10% virulent hamster tissue.
Vaccinated September 10, 1956, with 1 ml. of *L. canicola* vaccine lot 8.

TABLE 7. Titration of Canine Sera in Hamsters

Dogs	Bleeding Date	Volume of Serum Inoculated 1.0 ml.	0.5 ml.	0.25 ml.	0.1 ml.
Prevaccination	2-21-57	0/2	0/2	0/2	0/2
Vaccinated	2-28-57	2.5 ml. *L. canicola* bacterin			
Postvaccination	3-14-57	2/2	1/2	0/2	0/2
	3-21-57	2/2	1/2	2/2	0/2
Challenged	3-21-57	Challenge dose 0.5 ml. — 10% virulent hamster tissue			
Postchallenge	3-24-57	2/2	2/2	2/2	1/2
	4- 1-57	2/2	2/2	2/2	2/2
	4- 5-57	2/2	2/2	2/2	2/2
Control dogs					
Prechallenge	2-21-57	0/2	0/2	0/2	0/2
	3-14-57	0/2	0/2	0/2	0/2
	3-21-57	0/2	0/2	0/2	0/2
Challenge	3-21-57	Challenge dose 0.5 ml. of 10% virulent hamster tissue			
Postchallenge	3-24-57	1/2	0/2	0/2	0/2
	4- 1-57	2/2	2/2	2/2	2/2
	4- 5-57	2/2	2/2	2/2	2/2

Legend: Hamsters survived/challenged. Hamster challenge (0.2 ml. of 10^{-3} tissue — approximately 1,000 $l.d._{50}$. Hamster controls 0/3 (consistently die on 4th day). Hamsters challenged intraperitoneally 24 hours after inoculation of canine serum.

Summary

An evaluation of Leptospira vaccines in the bovine, porcine, canine species and hamsters is discussed. A method of evaluating the protection and resistance of animals by serum titration in hamsters is presented.

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Results of Sensitivity Tests in 1957

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One hundred blood specimens, 40 fecal samples, 30 throat swabs, and ten each of eye, ear, skin, and urine specimens were chosen as the most frequently submitted material for test sensitivity *in vitro* during the past year. Results are summarized in order to be of practical value. Ten antibiotics were always used on trypticase soy agar plates, although only the most effective are reported. The sterile plates were inoculated from previously grown tryptose phosphate broth cultures.

Cultures were incubated at 37 C. for at least 12 hours. Agar plates were allowed to incubate another 12 hours. The antibiotics were in the form of impregnated discs and the completely clear inhibition zone around each was the measure of the culture's sensitivity to the drug.

Of the blood cultures, 50 proved to be

pure culture staphylococcus, 40 were mixed bacteria, and ten were Gram-negative rod cultures. The most efficient drug and the number of times it was indicated as the first choice can be noted from the listing below:

Penicillin & streptomycin	18
Terramycin	14
Streptomycin	14
Tetracycline	12
Penicillin	11
Chloromycetin	10
Furadantin	9
Neomycin	8
Erythromycin	4

The 40 specimens of fecal material produced five pure cultures of Gram-negative rods with the remaining 35 showing a variety of mixed bacteria. The effective antibiotics in as many cases were:

Chloromycetin	19
Neomycin	5
Furadantin	5
Terramycin	4
Tetracycline	3
Streptomycin	2
Penicillin & streptomycin	2

Thirty throat swabs when cultured produced only two pure cultures: One a staphylococcus, and the other a Gram-negative rod. The remaining mixed bacteria grown in the broths were typical of organisms commonly found in this area. Antibiotics of choice were as follows:

Chloromycetin	10
Furadantin	6
Terramycin	6
Erythromycin	4
Tetracycline	4

Gram-negative rods predominated in 60% of the eye swabs and were inhibited in as many cases by:

Chloromycetin	5
Tetracycline	3
Streptomycin	2

Ear swabs produced Gram-negative rods in three instances, and pure cultures in 60%, the other bacteria being Gram-positive rods in two cases, and staphylococcus and Gram-negative cocci in one case each. They were inhibited in as many cases by:

Chloromycetin	3
Furadantin	2
Tetracycline	2
Streptomycin	2
Neomycin	1

Skin scrapings proving to be bacterial infections were mixed cultures with the exception of three cases of Gram-negative rod bacteria. These were inhibited by:

Chloromycetin	6
Furadantin	3
Streptomycin	1

The ten urines cultured gave a predominance of Gram-negative rods with two specimens growing in pure culture. Of these, six were inhibited best by tetracycline and four by neomycin.

As has been found in previous years a few of the drugs always seem more effective in combating the most common animal infections.

Piperazine Compound in the Prevention of Heartworm in Dogs

A piperazine drug, namely Caricide, (Lederle) was given a field trial over a period of two years for the prevention of *Dirofilaria immitis* (heartworm disease). Pups from four weeks to six months of age were used. Dosage was 20-25 mg. per pound of body weight given daily for three successive days every six months from date of first dose.

The dogs were from every walk of life, from roamers to the over protected ones. Of these 26 that satisfactorily completed the two year trial, nine or 34.6% were positive for microfilaria. This is about the average infection rate in the Bahamas.

An important point was noted, that in all of these nine positive cases flea control on the dogs was negligent, and in the negative dogs flea control was fair to good.—*A. Soltys, B.V.Sc., V.S., Nassau, Bahamas.*

Experiences have emphasized that imbalance of mineral elements in the diet can have drastic effect on the general health of all animals. Knowledge of mineral needs of domestic livestock is incomplete, states the author, but evident also is disregard of known nutritional facts in many instances related to various areas or to specific farms or ranches.

Mineral Imbalance in Animal Nutrition

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THERE is a growing concern that modern agriculture can have an impact on animal health with its extensive use of chemicals both on the soil and in animal rations. Recent experiences have emphasized that mineral imbalances can have some drastic effects on the nutritional health of livestock. Whether or not detrimental long-term influences derived from soil fertilization practices will become a major problem of concern to the animal nutritionist remains to be established.

What do we know about the mineral requirements of farm animals? The recommended allowances tables summarized in the National Research Council publications reveal that firm recommendations can be made for only three mineral elements (calcium, phosphorus and iodized salt) for cattle and sheep. Tentative recommended allowances are given for copper and cobalt. Precise data on requirements for potassium, magnesium, iron, manganese and zinc are lacking. Although such data is somewhat more complete for poultry, and also possibly for swine, the fact remains that if we consider all mineral elements which are known to be present in animal tissues and assumed to be essential for normal biological functions, we find that precise quantitative information is certainly far from complete.

Presented at the 40th annual meeting of the Southern Veterinary Medical Association, Roanoke, Va., Oct. 27-30, 1957.

Nutritional Facts Often Ignored

Although it is recognized that our knowledge of the mineral needs of livestock is incomplete it is also evident that in practice known nutritional facts are often ignored. An example may be used to emphasize an imbalance of calcium and phosphorus which has been observed in field experiences in Virginia. Tabulated below are the ingredients that might be used as a fattening ration for a 600-lb. steer and also the

amounts of calcium and phosphorus recommended for good nutritional health. It is evident that the substitution of timothy hay for alfalfa hay reduced the calcium by 68% and to a level less than half of the recommended allowance.

	Ca (gm.)	P (gm.)
3.5 lb. alfalfa hay	23.3	3.8
11.0 lb. corn	1.0	13.5
1.5 lb. cottonseed meal	1.5	7.8
Total	25.8	25.1
3.5 lb. timothy hay	5.6	2.2
11.0 lb. corn	1.0	13.5
1.5 lb. cottonseed meal	1.5	7.8
Total	8.1	23.5
Recommended daily intake	20.0	17.0

Field cases of leg deformities and lameness in cattle have been noted several times in recent years and were related to an imbalance such as is revealed in the above example.

Importance of Zinc

Recent findings establishing the importance of zinc in the prevention or cure of parakeratosis in swine is another example of a mineral imbalance which appears to involve the calcium to phosphorus ratio in the ration. The Alabama studies established that the disease was aggravated by supplements of limestone or bonemeal to a basal ration adequate in calcium and phosphorus (*Proc. Soc. Exp. Biol. and Med.*, 88:613, 1955).

Attempts have been made to quantitate the zinc requirement of swine under well-controlled experimental conditions. The Michigan studies indicate that 51 p.p.m. (parts per million) of zinc was not sufficient to protect completely against parakeratosis in a ration containing 1.5% calcium and 0.80% phosphorus. On a ration containing 0.98% calcium and 0.70% phosphorus, a zinc level of 49 p.p.m. in the ration was completely protective. (*Jour. An. Sci.*, 15:347, 1956.)

Studies at Beltsville, Md., indicate that in rations for growing swine which contain up to 1% calcium, the minimum zinc requirement for prevention of parakeratosis was between 44 and 80 p.p.m. (*Jour. An. Sci.*, 15:1036, 1956.) The Wisconsin data suggest that a ration containing 0.5% calcium, a level slightly below the recommended allowance for growing swine, was not completely protective against parakeratosis when it contained 28 p.p.m. zinc, (*Jour. An. Sci.*, 16:578, 1957.) From these studies it is evident that natural rations for swine can be limiting in zinc content and that limiting the calcium intake to below recommended allowances in itself will not afford complete protection against zinc deficiency lesions.

Since parakeratosis has been observed on a limited number of farms where garbage is fed, the Virginia station has analyzed several garbage sources for their zinc content, (Va. Agr. Exp. Sta. Tech. Bul., 133, 1957). Garbage collected at hospitals, households, hotels, restaurants, military installations, and a college dining facility, contained zinc in amounts ranging from 153 to 925 p.p.m. (dry basis). Based on these results the possibilities of parakeratosis due to a lack of zinc in the ration would appear remote, despite the observation that household garbage often contained as much as 1.5 to 2.0% calcium.

Why parakeratosis has become a disease problem in swine in recent years is not clear. Perhaps more extensive feeding on concrete floors, limited access to soil or forage crops, and possibly not enough attention to the calcium content of rations are contributing factors. In this connection, Virginia soils contain zinc in the range 75 to 125 p.p.m., pasture crops in the range of 40 to 60 p.p.m. Corn, the cereal grain widely used in swine feeds, in our experience contains only about 5 p.p.m. of zinc.

Wheat Pasture Poisoning

Another problem that appears to present itself with some increasing frequency is wheat pasture poisoning or grass tetany. In these conditions the blood magnesium level is severely depressed, calcium is usually lower while phosphorus may or may not be affected. This problem has been observed in Virginia in recent years in pregnant cows and even under conditions of dry-lot feeding

with only limited pasture during winter months. Even though the ration, upon analysis is found to contain liberal amounts of magnesium (0.20 to 0.3% when 0.06% is considered adequate) blood serum from such animals contains only about 0.05 to 0.10 mg. % of magnesium, contrasted with normal values of about 2.5 mg%. Animals with severe hypomagnesemia usually die unless therapy with calcium and magnesium salts is introduced prior to the onset of tetanic convulsions.

Various theories have been advanced as to factors that may contribute to this condition in cattle. Excessive soil fertilization with potash has been suggested as a factor suppressing magnesium uptake by pasture plants. Use of magnesium oxide as a fertilizer has been helpful in controlling grass tetany (*Nutrition Reviews*, 12:214, 1954).

Wheat pastures are usually high in protein and potassium content and attempts have been made to produce wheat pasture poisoning in sheep by feeding a ration high in protein and potassium (*Jour. An. Sci.*, 15:1263, 1956).

Fecal magnesium was observed to increase, urinary excretion was slightly reduced, with the net result of a lowered magnesium retention. Average blood magnesium levels also were reduced when the animals were on the high-protein, high-potassium ration, although tetanic symptoms typical of hypomagnesemia were not seen.

Optimum Mineral Requirements Under Study

This brief review of mineral imbalance problems in livestock should suffice to draw attention to the fact that much is still unknown regarding mineral nutrition. In order to be in a more favorable position with regard to the need for feed supplementation with minerals, particularly the trace minerals, the Virginia Agricultural Experiment Station has initiated a long-term study in dairy cattle. Initial emphasis will focus on whether or not a ration supplying about 5 p.p.m. of copper is adequate for growth, reproduction, and lactation and whether or not supplements of other minerals will influence the copper requirement. Field samplings of forage crops from the major soil types and geographic areas of Virginia over the past ten years have revealed that many pastures, particularly if non-legumes predominate, contain 5 p.p.m. or less of copper (dry basis) (Va. Agr. Exp. Sta. Tech. Bul., 117, 1951; 123, 1955; *Jour. Agr. and Food Chem.*, 3:226, 1955). Such pasture plants are usually also deficient in cobalt, particularly on the sandy soils in the coastal regions of the state.

Domestic Fish Meal as a Source of Various Salmonella Types

Salmonella have been isolated from imported fish meals by various European investigators. Periodically, some of these same exporting areas supply this country with fish meal. However, neither imported nor domestically produced fish meal has been studied bacteriologically even though several hundred thousand tons are used in poultry feeds every year.

In the present study 16 samples of fish meal were obtained from eight producing areas along the Atlantic and Pacific coasts. Of these specimens nine were positive for Salmonella and yielded 11 different serotypes. *Salmonella senftenberg, S. tennessee, S. oranienburg, S. bredeney* and *S. schwartzengrund* were among the most frequently isolated types. In view of the large volumes of fish meal being used in poultry feeds, the danger of the spread of salmonellosis to poultry from this source should be investigated. — *John R. Boring, III, M.S., Epidemic Intelligence Service Officer, Epidemiology Branch, Communicable Disease Center, Atlanta, Ga.*

Contagious Diseases in Antiquity

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The concept of contagion is classic to antiquity, and has been correctly identified as a doctrine of Varro, the Roman. To combat plagues, he advised that herds be divided into small groups and separated from each other, and moved from the pastures or even the infected region.

The isolation of sick animals was recommended and the avoidance of contagion was currently practiced. But the results of this summary and disconnected sanitary policy were certainly incomplete and irregular. Its precepts were usable, moreover, for certain contagions only. Against plagues that spread rapidly, only the intervention of the gods was sought.

Although there were a number of epizootics that can not be positively identified as diseases known today, there were others that can be easily identified.

Rabies was known throughout the ancient world, and its transmission to man by the bite of a rabid dog was admitted without question. Hippocrates, the physician, did not mention it. However, within 60 years after the full flower Hippocratic medicine had been realized, the philosopher and teacher, Aristotle, described rabies as a specific disease, affirming its transmission from the dog to other animals, but denying its contagiousness to man.

In the first century of the Christian era, Pliny the Elder described rabies in detail, and Plutarch attributed the following remark to Aristotle:

"You have undoubtedly seen mad dogs. As for me, I have seen horses that were also mad. Some say that rabies occurs also in cattle and in foxes; but suffice it to say that it occurs in dogs, and let no one doubt that."

In a well-known passage from the Metamorphoses, Apulius told the story of the commotion caused by a mad dog that bit man and beast furiously, and whose "poisoned bites transmitted the same fits of rage to some of those who received them." There were those who immediately demanded the death of mad dog bite victims, and Lucius, changed to a jackass by a sorceress, escaped death only by drinking a bucket of water to prove that he was not a hydrophobe.

Philomemus, who wrote in the third century A.D., described the symptoms of rabies in the dog as recorded by the Greeks and Byzantines. The best treatment was cauterization of the wounds, because fire was stronger than anything else and it destroyed the poison of rabies. The bite wounds were kept suppurating for at least 40 days to evacuate the poison.

While the Greeks clearly defined certain affections, glanders and pleuropneumonia, for example, the Latins, who were agronomists and veterinarians, seemed to renounce all sense of discrimination. Columellus described all herd diseases under the generic name of plague *(pestilentia)*. Vegetius stated that it was convenient to group all the contagious diseases that caused death under the heading of *malleus*. He recognized eight forms that seemed to comprise all the known contagious diseases, but which, outside of rabies, are impossible to identify. The *Mulomedicina Chironis* clearly states that in all solipeds there is a disease called *maleos* (glanders of Apsyrtus); but this disease corresponds to the plague in man, to *verago* in cattle, to *circius* (pox) in sheep, *acceus* (?) in pigs, and rabies in dogs.

It is difficult to understand the preoccupation manifested by authors who try to find similarities between bygone epidemics with contagions that actually exist today. The most reasonable hypothesis would seem to admit that a great many of these ancient forms have disappeared through the ages or have become so markedly changed that the forms in which they exist today are not recognizable.

For almost 20 centuries an extremely serious "plague" raged for short periods on the banks of the eastern basin of the Mediterranean. From there it moved westward into the center of Europe. The accuracy and agreement of the descriptions are such as to leave no doubt that it affected man and almost all of the animal species simultaneously. It was doubtless the same terrible pandemic that was raging, though already in an attenuated form, during the Middle Ages. Such a form does not correspond to any of the diseases that are known today, and it has not stood up in any attempts of the critics to compare it. Is it unreasonable to admit that it concerns a disease that has fortunately become extinct — let us hope so — while we are everlasting onlookers of the origin of new contagions and the progressive disappearance of others?

Translated and edited from Leclainche, E., *Histoire de la Medecine veterinaire*, Office du Livre, Toulouse, 1936, pp. 70-72.

SMALL ANIMAL PRACTICE

How would YOU diagnose this?

CASE NO. 1 Six-year-old pointer: unable to walk without intense pain in rear quarters, general stiffness, tenseness and pain on palpatation of lumbar vertebrae. Client stated that dog became progressively constipated as pain of movement increased.

Treatment with four injections of adrenocortical hormones daily and supplemental feeding of vitamins was initiated without results. What treatment would you recommend? For the dramatically successful regimen adopted, turn to page indicated below.

turn to page XLIII

Jen-S

Problems posed by dermal disorders classified as seborrheic have posed a difficult clinical problem. Herein the author relates experience with a stabilized sulfur compound, which has found favor in medical practice, as an effective topical agent for seborrhea in dogs and other animals.

Use of Polythionates and Sodium Thiosulfate in Seborrheic Disorders

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SEBACEOUS glands are closely associated with the hair. They are usually located in the angle between the arrector pili muscle and the hair follicle. They are sac shaped or lobed, and are composed of several layers of cells which produce sebum. The formation of sebum results from growth of the sebaceous gland. The cells fill the gland cavity and undergo a process of degeneration and disintegration, forming sebum as an end product. The size of sebaceous glands varies with species, breed, and area of the skin. Climate and environment have a marked influence on the production of sebum, as do certain internal disorders and parasitic skin diseases. Demodectic and sarcoptic mites influence size of the sebaceous glands, resulting in either an increased or decreased production of sebum.

Under normal conditions sebum production is continuous. The chief function of sebum is to lubricate the growing hair and to keep the skin soft and pliable. It also prevents the penetration of harmful substances into the skin and protects against the disintegrating effects of external moisture. Sebum is completely miscible with water. Thus, in a sense, it serves as a water reservoir which helps to keep the outer skin layer moist. In animals, particularly in small animals, there are numerous skin disorders associated with an increased activity of the sebaceous glands resulting in seborrhea. The hyperproduction of sebum is usually secondary to various general or local pathological conditions. Seborrhea may affect the whole body surface or it may be restricted to specific areas. There may be fatty crust formation (seborrhea crustosa) or increased oily secretion (seborrhea oleosa). In animals, crusted seborrhea is the more common.

Increased production of sebum may be accompanied by an inflammatory condition

Fig. 1. Generalized seborrhea.

of the skin (seborrheic dermatitis or seborrheic eczema). The true cause of increased activity by the sebaceous glands is not definitely known. It has been suggested that vitamin and hormone deficiencies and intoxications and infections may be primary etiological factors in the development of seborrhea.[1] Johannsen[2] reported seborrhea in infants with hypoproteinism. Similarly, we have observed seborrhea in young dogs and pigs suffering from protein deficiency. Intoxication from internal or external parasites such as ascarid and demodectic mites may predispose to seborrhea. Wirth[3] reported the development of seborrheic eczema following pectoral influenza in horses, and as a sequel to distemper in dogs. Some cases of seborrhea in dogs suggests a possible hereditary factor.

Clinical Signs

The clinical signs of seborrhea in various species of animals are generally similar.

Dogs. In short haired dogs the dry crusted type of seborrhea predominates, and is ordinarily seen on the face, neck, back, on the base of the tail, and on the abdomen. The extremities are not often affected. In long haired dogs seborrheic disorders are frequently found on the glabrous skin of the abdomen, on the inner sides of the thighs, and on the lower part of the thorax. Greasy crusts cover the affected skin and are tightly attached to the base of the hair. As the hair grows, the pellet-like seborrheic secretions remain suspended from them like a chain. Later on, the pellets fuse into clumps. When seborrhea develops on the abdominal skin or on the inner surfaces of the thighs, the skin becomes thickened, forming folds.

An oily type of seborrhea affecting the external ear canal may be seen in dogs in association with seborrhea of the skin. Dogs with seborrhea develop a characteristic fatty odor, particularly when they are kept in a closed room. The primary histologic change in canine seborrhea is hypertrophy of the sebaceous glands.

Horses. In horses, a generalized crusted form of seborrhea is observed most frequently. It involves the entire body surface with the exception of the extremities. In rare cases, seborrheic skin lesions are limited to the areas with long hairs, notably the mane and tail.

Sheep. In sheep, crusted seborrhea is relatively frequent and is commonly called false sheep mange. Lesions are found on the neck, back, and the shoulder regions.

Pigs. Kernkamp[4] described seborrhea oleosa in young pigs from four to ten weeks of age. Crusts were waxy or oily and were found on the arms, thighs, sides of the face, and on the thorax, and abdomen. Affected pigs experienced rapid weight loss, were anorexic and eventually died.

Treatment

The control of seborrhea, seborrheic dermatitis and seborrheic eczema has always posed a problem. Although numerous systemic and topical therapies have been proposed as remedial possibilities, generalized seborrhea remains an essentially incurable disease. Various parenteral preparations have been employed without success. Iodine, iron, arsenicals, vitamins, hormones and protein supplements have been administered but have not proved to be particularly beneficial. Likewise, reduction of dietary fat has failed to bring about appreciable improvement.

Of the many local remedies recommended for treating seborrhea in animals or man, sulfur retains the greatest popularity, and it is considered to be a valuable topical medicament.[5] Because of the widespread use of this element in dermatology, attention has been focused on the problem of how to achieve optimal therapeutic efficiency in its application to the affected areas of the skin. Topically applied sulfur desirably enhances exfoliation, but its action against the pathogenic cells associated with skin disease is of equal importance to its keratolytic property. It is expedient, therefore, that the sulfur be presented to these cells in its most active state.

Elemental sulfur is in itself not highly toxic to microorganisms.[6] Rather, it must be converted to other forms which do possess activity.[6] Once applied, exposure to air and moisture in the presence of tissue substances effects conversion of the sulfur to polysulfides and the more complex polythionic acids. The former exert little effect against pathogenic organisms, but the latter have been shown to be both germicidal and fungicidal.[6,7] Combes[8] pointed out that the polythionic acids, through their hygroscopic properties, bring about dehydration of the epidermis, thereby hastening exfoliation. Chardon[9] also determined that such forms of sulfur are satisfactory drying and exfoliating agents. This investigator further states that polythionic acids and their salts, the polythionates, are the active compounds of sulfur at the skin surfaces.

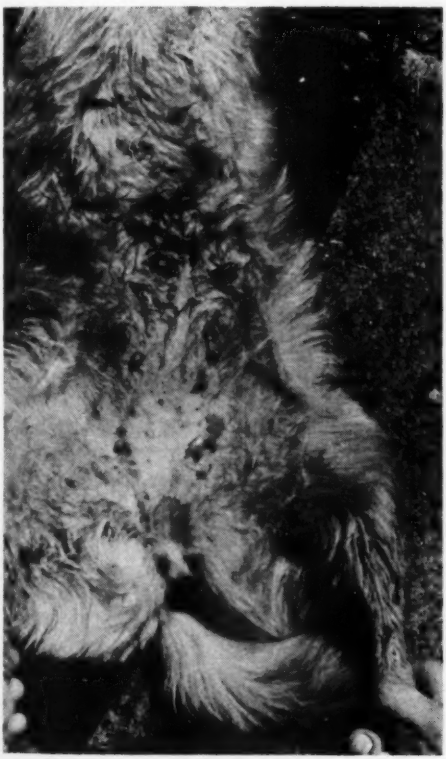

Fig. 2. Localized seborrhea.

In the past, the principal drawback to the use of polythionates was their inherent instability. However, a method of stabilizing these active compounds was eventually developed, and for a number of years these complex forms of sulfur have found favor with the medical profession in several European countries. Chardon[9] and Moller and Lomholt[10] have reported on the therapeutic and patient advantages associated with polythionate usage. In this country Finnerud and Riddell[11] and Delaney and Robarge[12] conducted clinical experiments to evaluate the polythionates as topical agents in the treatment of acne and seborrhea. The former investigators obtained beneficial results in 67 of 93 patients (73%) who had seborrheic dermatitis of the scalp, and in 13 of 20 patients (65%) with seborrheic dermatitis of areas other than the scalp. The latter physicians observed that a stabilized solution of polythionates elicited a satisfactory response in 58 of 64 patients (90%) experiencing acne or seborrhea.

It has been considered that the capacity of the polythionates to rapidly penetrate the skin and enter the underlying tissue may contribute to the therapeutic effectiveness of sulfur in this form. Recently, Neesby, Koff and Pircio,[13] by the use of radioisotope technics, designed a method to measure the rate and amount of absorption of polythionates by the intact skin of the rat. Using this procedure and a variation of same, Neesby, Pircio and Grattan[14] demonstrated that polythionates do readily pass through the skin and reach the tissues beneath. Scott[15] has treated a series of patients with radioactive sulfur. He observed that the

absorption and fate of S-35 in normal skin differs quite strikingly from that seen in cases of seborrheic dermatitis, acne vulgaris, psoriasis, and a miscellany of other dermatoses. According to Scott's findings, there appears to be a distinctive pattern of localization and mode of distribution of the radioisotope in each of the reference conditions. For example, in skin affected with lichenification, eczema and discoid or lupus erythematosus the sulfur remains extracellular, whereas in the case of seborrheic dermatitis it is found within the cell. The possible implication of this observation is discussed by the author.

Experimental Studies

During the past two years we have carried out studies to determine the effectiveness of polythionates in the treatment of seborrhea in animals seen at the clinic. In all, 37 cases have been treated to date: 14 dogs, two horses and one cat with generalized seborrhea; 12 dogs and two cats with localized seborrhea; and six dogs with seborrheic dermatitis. In addition to the application of polythionates topically, some of the animals also received crystalline sodium thiosulfate orally. Horses received 10 to 15 gm. of thiosulfate three times per day for a period of four to six days. Average-sized dogs were given a total of 1.5 gm. of thiosulfate in three divided doses daily for four to six days, depending upon the severity of the seborrhea. Recently the administration of thiosulfate intravenously has been studied. The results of these experiments will be reported later.

Four polythionate preparations were used in the course of our investigation. Two were stabilized aqueous solutions of polythionates, (Thionium—Jen-Sal)* differing from one another only in concentration. The first contained 2.5% polythionates; equivalent to 1.5% elemental sulfur; the second 5% polythionates equivalent to 3% elemental sulfur. The two other preparations tested were ointments. One of these** contained 2% polythionates, equivalent to 1.2% elemental sulfur, in a vanishing cream vehicle; the other was a combination of 1.5% polythionates and a 1.5% concentration of a quaternary ammonium complex of polythionates,** also in a vanishing cream base —total elemental sulfur equivalent, 1.2%. Treatment consisted of twice daily application of the polythionate preparations for eight to 14 days (longer in some instances). The liquid polythionates were liberally applied to the involved regions of the skin with mild massage. The creams were also gently rubbed into the affected areas.

*Dermasulf; kindly furnished by the Carroll Dunham Smith Pharmacal Co., New Brunswick, N. J.; available to veterinarians from Jensen-Salsbery Laboratories, Kansas City, Mo., under the tradename Thionium.

**Topisulph [polythionate plus bis-(lauryl-trimethylammonium) polythionate]. Also supplied by Smith Pharmacal Company.

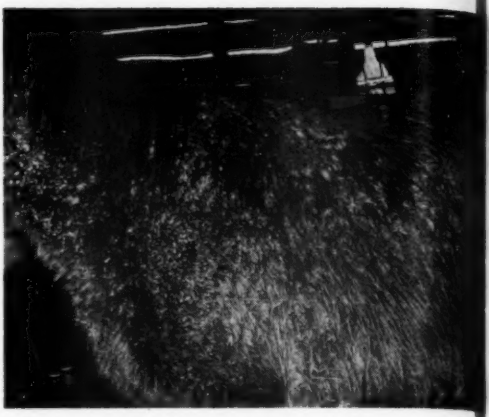

Fig. 3. Generalized seborrhea in a horse.

Results

Generalized Seborrhea. The two horses treated were originally assigned for euthanasia. Both recovered within eight weeks on the thiosulfate-polythionate treatment regimen, and thus far there has been no recurrence of the seborrheic condition. The one cat and nine of the 14 dogs treated made complete recoveries. Three dogs were markedly improved after treatment. In the remaining two response to therapy was unsatisfactory and ultimately the animals were destroyed. Histological examination revealed that in both these failures there was extensive enlargement of the sebaceous glands.

Localized Seborrhea. All 12 dogs and the two cats responded fully to the therapy. To

date there has been no evidence of a return of the condition in any of them.

Seborrheic Dermatitis. The six dogs presenting this condition made a full recovery and have remained symptom-free since. Two of them received only topical therapy; the other four, both topical and systemic treatment.

Conclusions

Our findings with the stabilized aqueous solutions of polythionates closely parallel those observed in clinical studies.[11,12] It can be stated that sulfur in this form is highly efficacious as a topical remedy for seborrhea and seborrheic dermatitis seen in animals. Both the 2.5 and 5% strengths were well tolerated by all animals treated. These liquids make administration a simple procedure. They offer the added advantage in that no visible residues remains at the site of application. This feature has significance since it is a deterrent to the natural inclination of an animal to remove topical medicaments as possible.

The preparations containing the polythionate form of sulfur in a vanishing cream base were found to be both effective and non-sensitizing. Recently a clinical study[16] has demonstrated that polythionates in a vanishing cream carrier make a suitable companion to the preparations presenting them in a stabilized aqueous vehicle. Our results confirm this observation. The creams are particularly useful when a lubricating agent may be of considered advantage.

In severe and generalized seborrheic conditions it is necessary to combine the topical treatment with the systemic administration of sodium thiosulfate.

Fig. 4. Localized seborrhea in a dog.

Summary

Thirty-two dogs, three cats and two horses presenting generalized seborrhea, localized seborrhea or seborrheic dermatitis were treated by the systemic administration of sodium thiosulfate and/or topical application daily of polythionates in stabilized aqueous solution or in a specially prepared vanishing cream vehicle. This treatment regimen yielded uniformly excellent results.

Sulfur in the form of the polythionates appears to be highly effective as a topical remedy for the control of seborrhea and seborrheic dermatitis. Both the aqueous and vanishing cream preparations used in this study were well tolerated, no case of sensitivity to either the active component or carrier having been noted. These medications are simple to apply. Following gentle massage no deposits of sulfur remain on the skin. There is then the advantage that the treated animal cannot successfully remove the medicament after application has been effected.

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Penicillin

Cited at the Antibiotic Symposium held in Washington, October 1957, was the tremendous increase in production of penicillin since the termination of World War II. In 1945, there was only one type of penicillin preparation — the injectable sodium or calcium salt.

Today there are 121 such preparations available commercially. Over these past few years penicillin has been injected, fed, spread over parts of the body, insufflated, and sprayed. No surface or cavity of the human or animal body has remained inviolate.

Antibiotics as a class are probably the most widely used therapeutic agents, and penicillin the most widely employed.

Authorities have estimated that about 10% of the human population in this country has developed a "proneness" to become sensitive to some food, drug, cosmetic. This formula, when applied to penicillin use, has evoked some concern for some 17,000,000 individuals who may react unfavorably.

The *American Medical Journal* (Feb. 28, 1958) comments that "The great majority of reactions occurred after administration of the antibiotic under the supervision of a physician." In spite of the number of reactions, it must be realized that the survey covered a three-year period during which time approximately 600 tons of penicillin were produced for human use, equivalent to over 2,000,000,000 average daily doses of 300,000 units.

Incidence of Rabies

A statistical table prepared by the Animal Disease Eradication Division, Agricultural Research Service, USDA, illustrates reduced incidence of rabies in all animals and man during the past 20 years and effectiveness of control measures applied.

During the ten-year period (1938-1947) total number of cases reported was 90,019 for an annual average of 9,002. Only 73,307 were reported for the period 1948-1957, or an average of 7,330 per year, indicating a reduced incidence approaching 20%.

Incidence

Of particular significance in the data reported was reduction in number of cases in dogs. During the early part of the survey period, annual average dog cases approximated 8,000. Less than 2,000 cases in dogs were reported for 1957.

In contrast, incidence appears to be increasing in wildlife (various species) and cattle. Whereas only 44 cases were classified as occurring in "miscellaneous" species in 1938, 1,989 are noted in this category for 1957.

Number of cases in man reported total 450 for the past 20 year period; total for all species, 163,326.

Statistical material presented is tempered by the statement that "it is believed the reported cases do not represent all that occurred."

Details concerning tendon healing are quite well understood. Lacking is time required for injured tendons to regain original strength. Findings and conclusions of original research conducted by the author as a postgraduate project as reported here were presented at the 40th annual meeting of the Southern Veterinary Medical Association, Roanoke, Virginia, October 27-30, 1957.

Tendon Healing

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REMARKABLY little information on tendon healing is to be found in veterinary literature. This is of no serious import in many respects since tendon healing is about the same in all species, and there is a great volume of information on tendon healing in man. However, mostly lacking in human medical literature is information on how much time is required for healing tendons to regain their original strength. That such information is lacking is easy to understand since human patients ordinarily follow the doctor's directions and put the injured part back to work gradually. But veterinary patients can not follow directions and generally attempt to use the tendon as soon as restraining devices or medication are removed. Consequently, an answer to the question, When is a tendon healed?, is of great importance to the veterinary surgeon, who must decide when to remove restraining devices. How soon weight bearing should be allowed is a question of particular importance in large animals.

Before these questions can be answered, it is necessary to decide what is meant by "healed." Most soft tissue wounds are considered healed when the defect caused by the wound has been cleared of debris and filled in with new tissue. However, this new tissue can be instantly differentiated histologically from the surrounding "normal" tissue. In weight-bearing structures such as bone, healing can not be considered complete clinically until normal function is restored. In tendon, therefore, it seems logical to consider healing complete when the tendon is again able to carry out its physiological function.

Healing Time

It has been shown[1] that the rate of fibroplasia is the same in the healing of cutaneous wounds in various species of animals. This fibroplasia appears to occur as an independent biologic phenomenon unrelated to species, or even type of tissue, and it cor-

responds to the process of growth.[1] However, although rate of fibroplasia may be the same, time required for wounded tissues to regain normal functional strength varies widely. For example, Howes *et al.*[1] found that normal tensile strength of cutaneous wounds was regained "in the rat in 60 days, in the rabbit in 180, while in the dog the scar does not regain the normal strength of the skin even after 385 days." This same principle applies to tendons: Healing rate is the same, but healing time depends on how strong the tendon needs to be to carry out its function.

Process of Tendon Healing

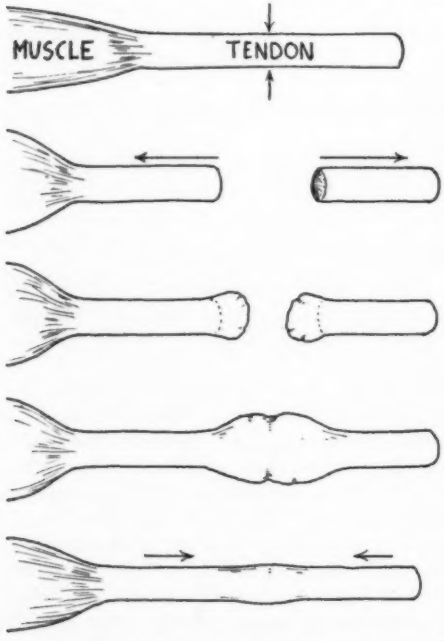

Fig. 1. Diagram illustrating, from top to bottom, the healing of a severed tendon in the absence of excessive inflammation. When the tendon is severed, the muscle retracts, drawing the cut ends apart. Soon pseudopodia begin to grow out, eventually restoring continuity of the tendon. Finally, the new-tissue bridge contracts, restoring the tendon to almost, but not quite, its original length. In the case of the achilles tendon, the remainder of the "slack" is taken up by the animal's adjusting the angle of hock and stifle joints. As a result there may be no noticeable limp.

When a tendon is severed in tendon sheath it will make an attempt to attach itself to something, or to reach out and join its opposite end by sending out a pseudopodium.[3] If severed where there is no gross tendon sheath (as in the case of the achilles tendon) a thick, jelly-like tube soon will extend out as a pseudopodium and attach. If the two severed ends touch, or if the pseudopodia touch, they will grow together and eventually undergo a certain amount of contraction, reestablishing the continuity of the tendon. (See fig. 1.)

If a tendon is bruised or only partially ruptured, it will undergo repair during which it will become swollen and soft. After one to three weeks, such a tendon may rupture completely as the result of a relatively trivial strain.

Tension plays an important role in the differentiation of new fibrous tissue to resemble tendon. Tendon transplanted to a site where it suffers no longitudinal stress gradually regresses to tissue resembling simple connective tissue. Conversely, the fibrous tissue which bridges the gap in healing tendon begins to look more and more like true tendon as it is subjected to the strain of usage.

If the gap in the severed tendon is too great, or if inflammation is severe, the pseudopodia are less helpful and the tendon ends are likely to attach themselves to the paratendon, destroying gliding action and function. It should be remembered that if a tendon becomes adhered at one point in its sheath, it will rapidly become adhered from that point distally. (See fig. 2). In the case of the achilles tendon, which has no true sheath, healing may occur against greater odds and with less than expected impairment of function.

Surgical freeing of a tendon adhered to its sheath ordinarily is futile if it is simply dropped back into the same cicatricial bed. The cicatrix will reform and exercise can not prevent this. Human surgeons have developed technics for preventing re-adhesion by interposing between the tendon and its bed a layer of fatty tissue, muscle fascia, or human or bovine fibrin film.

In surgical operations on tendons, care

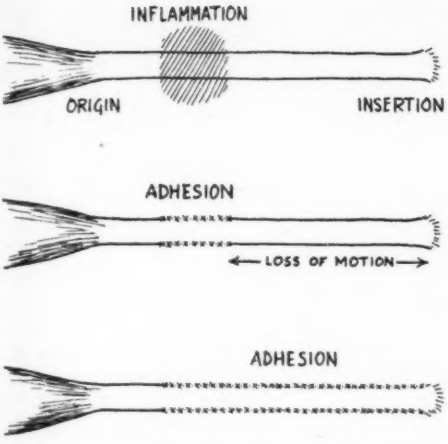

Fig. 2. Severe inflammation (top) usually results in adhesion of the tendon to surrounding tissue (center), destroying gliding action. Once the tendon is thus immobilized, it will quickly become adhered from the point of original inflammation to its distal insertion (bottom).

approximating that employed by plastic surgeons should be used. Sterile technic, small gauge suture and needles, and avoidance of crushing or other trauma are essential.

Experimental Study

In an experiment conducted by the writer at the Ohio State University[3], 42 adult rats were used. In each animal, the right achilles tendon was traumatized while the left was used as a control. In 18 rats the tendons were divided surgically and allowed to heal without suturing or bandaging. In 24 rats the tendons were uniformly crushed with the tip of a six-inch Mayo needle forcep. In six of these 24 the same tendons were re-crushed at the same sites on three succeeding dates at six-weeks intervals.

It is, of course, not possible to watch tendons heal as skin healing can be watched. Neither is it practical to test the tensile strength of a tendon in a living patient. It was necessary therefore to devise a method for testing the tensile strength of tendons at various stages of healing in order to obtain information about the return of healing tendons to physiological strength.

At intervals during the healing process some of the rats were destroyed, both hind legs removed at the coxofemoral joints and the skin removed from these legs. Then all structures except the achilles tendons were divided midway between the stifles and hocks and each leg was placed in a Dillon Universal Testing Machine. (See fig. 3.) Specially designed lucite clamps were used to adapt the leg to the testing machine. (See fig. 4.) One clamp was fastened against the medial and lateral aspects of the thigh; the other was fastened against the anterior and posterior surfaces of the metatarsal region. The leg then was attached to the machine with the stifle and hock joints in a partly flexed position. The machine was turned on and the two parts of the leg were pulled apart until the achilles or one of its attachments broke. The heaviest resistance encountered during the pull was indicated on the machine dial in pounds.

Fig. 3. The Dillon Universal Testing Machine used to test the tensile strength of rat tendons. Electrically powered, the machine pulled the achilles tendon apart at the rate of 12 inches per minute until some part of the tendon-muscle unit broke. The maximum pull exerted remainded indicated on the dial in pounds. All testing was done in a room conditioned for constant temperature and humidity (75 F.; 50% humidity).

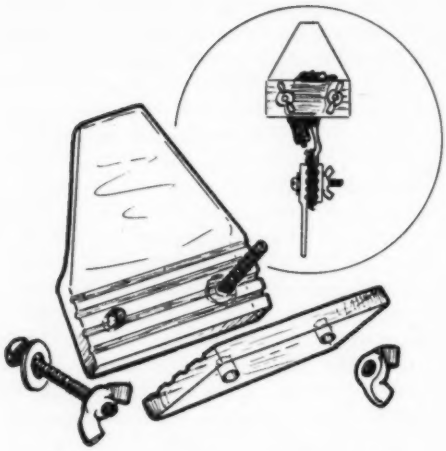

Fig. 4. Diagram of the lucite clamp used to adapt the rat leg to the testing machine.

Findings

As might have been expected, the data revealed that regaining of tensile strength in these tendons was directly related to healing time. Other interesting facts were learned.

1. The 18 achilles tendons divided surgically united spontaneously without suturing or immobilization. Stewart[4] previously had reported the same findings in cats.

2. Severed tendons regained the strength of their muscles and attachments by eight weeks after operation, but did not regain the strength of the opposite, normal leg until 22 weeks after operation. Evidently the muscle of a severed tendon undergoes significant loss of tensile strength during the healing period.

3. Tendons which were crushed once regained the strength of their muscles and attachments by six weeks, but did not regain normal strength until ten weeks after crushing.

4. Tendons crushed four times at six-weeks intervals gained normal strength three weeks after the last traumatization.

These and other[5] data suggest that healing of tendon is best and most safely accomplished if the tendon is immobilized and relieved of tension during the first two or three weeks, then gradually subjected to increasing use after three weeks. In the case of severed tendons, contraction occurs immediately, separating the cut ends. If the tendon is not sutured, this gap ordinarily is filled in with fibrous connective tissue, causing the restored tendon to be longer than the original. However this lengthening is compensated for partly by contraction of the healing scar and partly by the animal's changing the angles of joints above and below the tendon.

An interesting finding was the development of fibrocartilage in the tendons which had been repeatedly crushed. Thus fibrocartilage development in tendons may be a reaction to repeated trauma. Todd[6] has called attention to the occurrence in aged persons of "small osteophytic outgrowths" into muscular attachments and tendon insertions. He states that "they probably result from the stress and strain of use, a form of injury and repair cumulative during life."

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Leptospira pomona infections have been serologically demonstrated in Wisconsin's native deer population. Over 30% of serums tested have shown positive *L. pomona* titers.

Adults lose more teeth from diseases of the gums and periodontal tissues than from dental caries.

DR. WILLIAM G. MAGRANE

President

Dr. William G. Magrane, practitioner at Mishawaka, Indiana became president of the American Animal Hospital Association during the closing sessions. The association met in convention April 23-26, 1958 at Chicago.

The AMERICAN ANIMAL HOSPITAL ASSOCIATION

The largest number of veterinarians ever to attend an annual meeting of the American Animal Hospital Association was treated to a well planned and conducted scientific program at the Drake Hotel, Chicago on April 23-26, 1958. Total registration exceeded 800; veterinarians numbered approximately 500.

Preconvention Workshop

Beginning with four hour-long sessions on Wednesday morning, the program developed as a postgraduate training course at which selected speakers came to grips with current problems. These sessions were billed as Preconvention Seminars and Workshops and were opened to all. Subjects discussed included Clinical Test, Skin Disease, Radiology, and Photography. Those purchasing tickets rotated from station to station where facilities were provided for study and discussion. A host assigned at each station with assistants made up the faculty.

At the Clinical Test section, Dr. J. G. Peck, host, was assisted by Dr. Charles E. Bild, Dr. V. G. Crago, Dr. Lee R. Phillips and Dr. William J. Zontine. Here groups gathered around tables where samples, reagents, centrifuges, et cetera were provided for conduct of various tests. Special consideration was given to blood chemistry and direction for conducting the hematocrit test, sedimentation rate, icterus index and buffy coat layer by the means available, including employment of the new hematocrit centrifuge.

Dr. F. Kral was principle lecturer at the section on skin. Here typical cases common skin diseases of dogs were presented. Discussions included the nature, diagnosis

The President-elect

Dr. William K. Riddell

Dr. William K. Riddell, Los Angeles, California, vice president, was named president elect of the American Animal Hospital Association during the recent convention at Chicago.

and pathogenesis of these disorders and recommendations for their medical management.

Radiology proved most interesting. Here equipment was displayed and demonstrated. Positioning patients for both skeletal and soft tissue work was also featured. Dr. Theodore J. Lafeler Jr., host, was ably assisted by Dr. Myron Bernstein, William H. Crago, and Irwin E. Kretchmer.

Photography, conducted in parlor C, included demonstration of equipment for making movies and still pictures of procedures, tissue specimens and roentgenograms. Interest demonstrated indicated that visitors acknowledged the value of photography for case records and for reporting.

General Session

General session began on Thursday morning and continued through Saturday noon. Highlighting the first day included presentations on Allergic Dermatoses in Dogs by Dr. F. Kral and consideration of some matters concerned with the incidence of hip dysplasia in purebred dogs by Dr. Otto Schales. At three sessions presentations from the rostrum were alternated with demonstrations via closed circuit television, the latter through the courtesy of Allied Laboratories and the Radio Corporation of America. Personalities presenting discussions revealed apparent depth of talent in the profession. Less well known practitioners also demonstrated high perfection of technics in their presentations.

Though a considerable portion of this program will be published, much does not lend itself to reproduction, but served only for the profit and pleasure of those in attendance. Dr. William J. Foster functioned as chairman of the Program Committee.

Awards

Dr. Mark Allam — receiving the Gaines "Fido" from Harry Miller (left).

The Committee on Awards selects recipients from among nominees proposed by members. This year the handsome plaque, citation and monetary award, project of the Mark L. Morris Animal Memorial Foundation, went to Dr. Carl F. Schlotthauer, professor of experimental surgery at the Mayo Foundation. He has served as veterinarian in an advisory capacity for 35 years at the Mayo Foundation and Mayo Clinic — a most unique role.

The Gaines Veterinarian-of-the-Year award presented annually by the Gaines Dog Research Center went to Dr. Mark

Allam, dean, School of Veterinary Medicine, University of Pennsylvania, Philadelphia. A monetary award accompanied the presentation of the well-known "Fido."

Entertainment

Those having responsibility for planning and making arrangements for the entertainment of guests and visitors during off hours were commended for providing a series of enjoyable events. Beside the annual preconvention golf tournament an evening was arranged at the famous Kungsholm Restaurant and Puppet Opera, President's Reception and Banquet, and a number of luncheons that have become traditional.

Officers

Dr. William G. Magrane, practitioner, Mishawaka, Ind., was advanced from president-elect to president, and assumed the role of first officer at the closing session. Elected as president-elect was Dr. William K. Riddell, Los Angeles, Calif., vice president, Dr. Wayne H. Riser, Skokie, Ill. Dr. Ralph E. Ruggles was reelected treasurer. The Executive Board reemployed Doctor Riser as executive secretary.

Dr. Carl F. Schlotthauer — holding the plaque that represents the Mark L. Morris Animal Foundation Award.

The A.A.H.A. will meet again at Colorado Springs, Colo., May 4-9, 1959.

Colorado Veterinary Medical Association Sponsors Radio Program

A RADIO PROGRAM in Denver, sponsored by the Colorado Veterinary Medical Association, has captured the imagination of its Rocky Mountain listening audience.

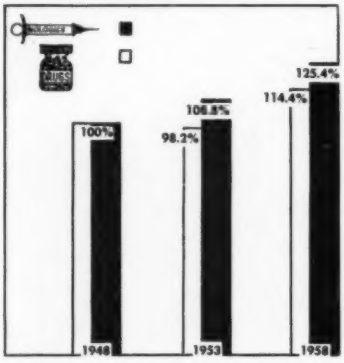
An informal 15 minutes of "over the coffee" chit chat about veterinary subjects, the program features a friendly veterinarian, "Doctor John." Actually he is Dr. Gail Gilbert, executive secretary of the Colorado Association, but his identity is not known to the listeners.

The other half of the conversation is borne by Bob Lilly, a long-time personality of station KOA, an NBC affiliated station.

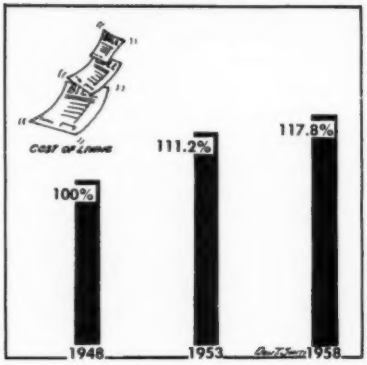
In the broadcast, neighborly "Doctor John" (right) drops in for his morning coffee with Mr. Lilly (left). Doctor Gilbert, often using suggestions of fellow veterinarians, prepares the entire script.

The program was launched last October and has prompted hundreds of letters from listeners. Some weeks the correspondence has numbered as high as 65 letters.

GRAPH 1. Rising Cost of Small Animal Biologics and Drugs — 1948-58



GRAPH 4. Rising Cost of Living — 1948-58

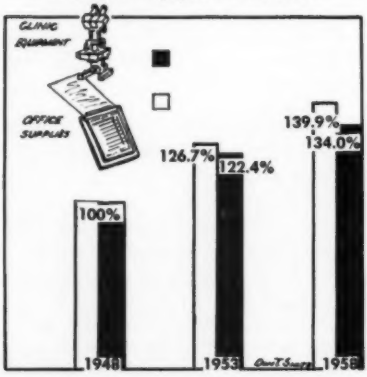


SMALL ANIMAL HOSPITAL

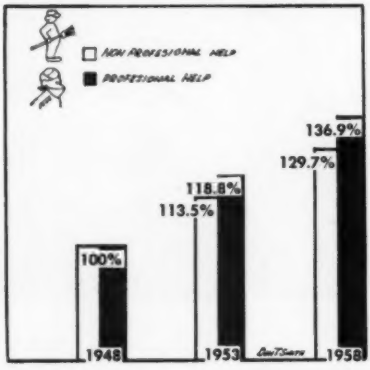
Business Records and Office Management

From a report presented by the Committee on Records and Office Management at the annual meeting of the American Animal Hospital Association, Chicago, Illinois, April 23-26, 1958 — Dr. E. Edgar Ruebush, chairman.

GRAPH 2. Rising Cost of Office Supplies and Clinic Equipment — 1948-58



GRAPH 3. Rising Wages of Nonprofessional and Professional Employees — 1948-58



DURING THE PAST TEN YEARS, many small animal practitioners have been caught in a cost-price impasse. On the one hand, fixed costs as well as out-of-pocket expenses involved in the business operation of a veterinarian, have been climbing. Prices of gasoline, clothing, food, drugs, biologics, and equipment have been going up along with the rest of the economy. At the same time many veterinarians have experienced difficulty in passing along these rising costs to their customers, and have therefore not been able to participate fully in the returns to which their investment and training entitles them.

In many areas of the country — and in many areas of practice — events have proved that a veterinarian's services are price inelastic. Not unlike the price barrier that attends the sale of certain products — such as chewing gum, coffee, et cetera — the veterinarian's prices for services are frequently restricted. In many areas a veterinarian will be unable to get more than $10. for a spay operation on a cat; in others the practitioner might be able to get as much as $30. for the same work.

The most telling anomoly that emerges from questionnaires submitted to small animal practitioners is the tendency to adjust veterinary practice to existing conditions. Practitioners gear their charges to a series of highly special situations not easily reflected in statistical averages.

In a series of charts prepared by the Committee on Records and Office Management, Dr. E. Edgar Ruebush, chairman, members of the American Animal Hospital Association were appraised of their institutional status at the recent Chicago meeting.

Based upon information obtained from a membership questionnaire, and on economic information obtained from the Department of Labor, Bureau of Labor Statistics, several different veterinary supply companies, the Chamber of Commerce of the United States, and the Library of Congress, these charts are self explanatory.

Record Data

Graphs 1 and 2 are based on averages of ten different products; graphs 3, 5, and 6 are based on averages of more than 100 samples; and graph 4 is based on thousands of items involved in the cost of living.

With 1948 as the base year (100%), the continuing rise in prices is evident with only casual inspection of these charts.

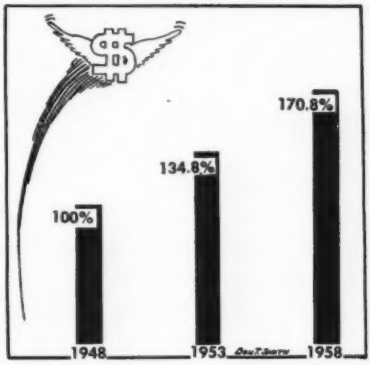
In one area spay and castration may be up whereas boarding and grooming remain constant; in another area the reverse will be true — boarding and grooming prices will be up, whereas spay and castration remain the same.

Most veterinarians who believe their charges to be low have a reason: They are concerned about public resentment or criticism; they operate in a low income area; or they feel that their present prices yield the best profit (through greater volume).

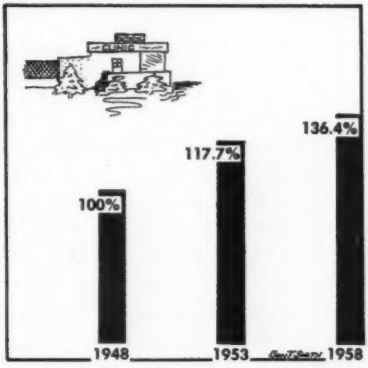
Veterinarians who have been unable to raise their overall charges by at least 36% in the past ten years have not kept pace with the economy.

In order to cope with this economic fact of life, veterinarians are obliged to understand fully the scope and direction of trends now taking shape.

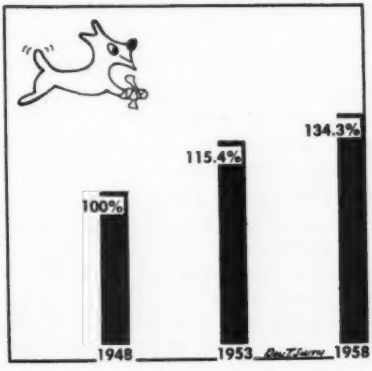
GRAPH 5. Increase of Hospital Property Taxes — 1948-58



GRAPH 6. Overall Cost of Maintaining a Hospital — 1948-58



GRAPH 7. Overall Charges Made by Veterinarians — 1948-58



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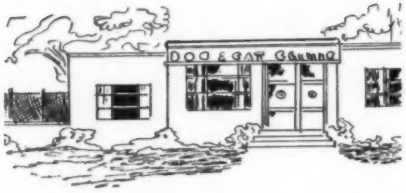

CLIFFORD L. McGINNIS, D.V.M.
Peoria, Illinois

The Veterinarian and Credit

Credit extended by the veterinarian to pet owners is in a class by itself. This may or may not be because an owner's affection for a pet is frequently ephemeral. As long as Rover is on hand each evening to greet the returning bread winner with a wagging tail and a friendly bark, nothing is too good for the pet. But if Rover runs away or gets hit by a Mack truck, it is seldom long before the memory of the pet is as feeble as that of a rich relative suddenly tasting insolvency.

It is axiomatic that more time and money is spent on those that die than on those that recover. If a pet dies in the hospital, we render a statement in full immediately. Owners are more inclined to pay while the situation is fresh in mind and before friends start the brainwashing process by reciting lurid tales of cures that might have worked.

Emergency surgery, which usually means cesarean section in the middle of the night, presents a difficult collection problem. Such patients usually belong to individuals who wait as long as possible before presenting their pets, either because they can not afford surgery or are sure the bitch will whelp normally. The incidents that lead up to emergency surgery normally take shape while you are in a sound sleep. They gather speed when you hear a description of symptoms and a report on the length of time the dog has been in labor. They come to a crashing finale when you decide it will be necessary to operate. You invite them to present the bitch at the hospital, and you meet them there. At this point they declare bankruptcy. Not many of us have the steel nerve to go back to bed and leave them with their troubles.

There are owners with pets that have a bad ear or bad skin. Veterinarians who treat them as out patients expect to be paid upon recovery, which may be after five or six treatments. But before completion of the prescribed course the owner loses interest. The condition worsens or remains unresolved. Such clients are slow to pay.

And there is the type of individual who has no intention of paying. Such a "deadbeat" will run his credit as far as he can at one place and then take his problems elsewhere.

Another type has ample funds but pays with great reluctance. I am certain that this type lets bills pile up from one month to the next and enjoys a fat checking account at the expense of creditors.

Those who are committed to the evil of extending credit may do well to remember a few fundamentals.

1. Give the client an estimate of charges at the time of the first visit. This will preclude an unpleasant surprise when the work is completed. Do not ask the question, "Will you pay this or do you wish to charge it," when returning a patient to the owner. By saying, "Your charges will be $10. Mr. Jones," he will more often than not pay immediately.

2. Keep a book of universal checks handy.

3. Try to send statements at the end of each month.

4. A statement can be mailed as soon as work is completed for a specific job.

5. If there has been no response at the end of three months, send a registered letter. Try to telephone the account four or five months after the bill is due. At the end of five or six months, turn the account over to a collection agency. (The first thing an agency will want to know is the client's place of employment. It is well to have this information on the record card.)

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Guest Editorial

THE A.V.M.A.—WHAT IS IT DOING FOR YOU?

W. W. ARMISTEAD, D.V.M., M.S., Ph.D.

President, American Veterinary Medical Association, and
Dean, College of Veterinary Medicine
Michigan State University
East Lansing, Michigan

VETERINARY MEDICINE has made tremendous advances in professional and social standing during recent years, but it still has a long way to go. Some say the profession can never attain equal status with human medicine because the physician treats human beings whereas we treat animals. This is faulty reasoning. Physicians were not always held in such high esteem. In little more than a hundred years the medical profession has progressed from barbering and midwifery to become a most noble human calling. What has brought about this change? Human life certainly has not increased in value; indeed, with steadily increasing populations and lengthening life expectancy, it may have declined a little.

Of course medicine has progressed in part because of its scientific accomplishments. But most of the advance is due to improved ethics and public relations. Contrast today's typical physician with his counterpart of a century ago who wore a badge of pus and blood on his lapel and muttered darkly of "leeches" and "potions." By exemplary public relations and ethical behavior, today's physician has reached the pinnacle of importance in human society.

This accomplishment of human medicine can be duplicated by the veterinary profession. Our progress too, has been conspicuous. But there still is much to do. The capabilities and potentialities of veterinary medicine are fully understood by too few people. And there are still society-conscious mothers who would not want their daughters to marry veterinarians.

Veterinarians must write and speak more. Words like business, customer, kennel, advertising, and "shot" must be deleted from our professional vocabulary and replaced with words like practice, client, ward, public relations, and injection. We must enter wholeheartedly into community life. We must join, support, and work for our professional societies. We must adhere rigidly to codes of moral principles, social etiquette, and professional ethics. When these are combined with competent service, the profession can not but prosper and grow in stature.

President—A.V.M.A.

W. W. Armistead
D.V.M.

As president of the A.V.M.A., Dean Armistead has continually stressed the role of the Association in modern practice. These remarks were presented at the 40th annual meeting of the Southern Veterinary Medical Association, Roanoke, Virginia, October 27-30, 1957.

Ethics

Ethics, like patriotism and motherhood, are generally considered to be desirable. Yet a distressing number of veterinarians fail to govern themselves according to the principles of professional ethics. The reason is probably the prevalent misconception that a practicing veterinarian can not be both ethical and financially successful. That ethics and financial success are entirely compatible should be obvious to all but the most immature and shortsighted.

Attempting to choose between ethics and financial success is like trying to choose between courtesy and friendship. Fortunately, a choice is not necessary. We may have both ethical standing and profit. The only problem lies in how to reconcile the two. Here are some suggestions:

In order to be both ethical and financially successful, practice should be made up of at least three ingredients: Proficiency, showmanship, and salesmanship.

Proficiency. Although it is more nearly excusable, it is just as unethical to be incompetent as to be dishonest. In fact, dishonesty often is resorted to as a means of covering, or compensating for, professional incompetence. Certainly with today's excellent veterinary colleges and splendid veterinary literature there is no excuse for gross incompetence.

Showmanship. Applying this term to veterinary practice is likely to nettle ethical purists. Nevertheless ethical showmanship can make the difference between financial failure and success in an ethical practice. The client's only means of judging the capability of his veterinarian is through impressions and from his own point of view. The veterinarian who has shown visible concern, sincere interest, and compassion for his patient will not need to resort to misrepresentation to justify his fee. His client will have sensed the solid value of the service and will not need material evidence in the form of placebos to pad out the illusion. And while a low patient mortality rate is of utmost importance to the clinician, more impressive to his client—because it is visible—is an orderly, well equipped clinic.

Salesmanship. This term also has developed an unsavory connotation for professional men and must be carefully distinguished from its ugly cousins, extortion and fraud. A speech before a civic club, a talk to a 4-H group, a timely article on preventive veterinary medicine for the local newspaper, flawless social conduct, appropriate dress—these are all ethical forms of practice promotion (salesmanship). Besides being morally defensible, they are at the same time more gratifying and more financially remunerative than are defiling a colleague, charging for services not rendered, or "talking up" an expensive but unnecessary operation.

Efforts to improve and maintain ethical standards are in evidence throughout the profession. The Code of Ethics developed and promoted by the A.V.M.A. is a significant contribution in this direction. American Animal Hospital Association sponsored Moss Essay Contest each year focuses on ethics the attention of students and graduates alike. Local associations are voluntarily cleaning up their telephone directory listings. Gaudy hospital signs are seen less

frequently. Professional stationery is becoming dignified. There has been somewhat less progress in the realm of personal conduct. But while there is almost universal agreement that exemplary ethical behavior is desirable, there are differences of opinion as to who or what is to be blamed for our persisting minority of "ethical delinquents."

Favorite targets for blame are our modern veterinary colleges which often are accused of failing in their obligation to teach ethics. I doubt that the colleges are to blame—any more than one could logically blame the churches for populating the prisons. I am sure that the colleges could and should do a better job of teaching ethics, but no amount of time devoted to the subject in school could assure that all graduates would be forever ethical. Today's graduates know about ethics and nearly all of them believe in its principles when they leave school. But ethics, like religion and etiquette, are best maintained by continuing association and good example. And this brings us to the real culprits, today's unethical practitioners, especially those who have been financially successful, for they are the ones who most effectively influence others. And scarcely less guilty is the apathetic majority which fails through its state boards and associations to take definite action against offenders.

Our graduates know about ethics. It is up to the elder statesmen of the profession to demonstrate that it is both proper and profitable to practice ethics outside the classrooms.

Public Relations

Too often these days the term "public relations" is used in a too restricted sense; *i.e.*, relations toward our clients or prospective clients in veterinary practice. Actually, public relations are important to all branches of the profession, and to all segments of the public. Nor are public relations something you can take or leave alone. As James Bryan said in his book, Public Relations in Medical Practice, "Of course, everyone has public relations—be they good or bad—as inescapably as he has a shadow on a sunny afternoon".

Sometimes we are likely to forget that public relations includes intraprofessional and interprofessional relations. And the appearance veterinary science and medicine presents to that considerable segment of American citizenship which will never become clients is likewise important. The abysmal ignorance about the functions of veterinary science exhibited by the former Secretary of Defense is a case in point. His pronouncement dealing with the veterinary services of the Armed Forces must have resulted from our own failure to educate him and his advisors on the value and potential of this many-faceted profession. An overwhelming and tragic example of poor public relations.

The whole subject is a fascinating one. No other aspect of behavior exerts such a tremendous influence on effectiveness as well as financial reward. The professionally trained man must remember that those outside the profession have no reliable way of judging technical ability. To those we are as we appear to be—and we may not appear to be as we really are.

Good public relations ("human relations" might be a better term) can not be attained by legislation or by advertisement. To be most effective, favorable public relations must be sought in a subtle, dignified manner, particularly where a profession governed by ethics is involved. The A.V.M.A. has a good public relations organization covering both intra- and extra-professional areas. Russell Rongren and Brian Forster are doing splendid jobs and their accomplishments will increase in geometric progression. But do not expect sudden or startling changes to result from these efforts. These are by their nature subtle and keyed for the long haul.

Veterinary Education

Since I am what is referred to as an "educator," I suppose you are expecting me to say something about veterinary education. I shall try not to disappoint you. Although I am a practitioner at heart, veterinary education is my job and I am very much interested in it.

Veterinary colleges have a number of

problems in common. Most of them suffer from inadequate financial support, an ailment which currently afflicts education in general. Most engage in a continuing struggle to attract and keep a competent faculty. Some are in need of new buildings, administrative renovation, or more clinical cases. But there are other problems less tangible and more difficult.

Admissions Standards. As the field of veterinary medicine broadens and changes character, we must reappraise admission standards. Heavy emphasis on the importance of a rural background for all students may be unwise, particularly if we are really interested in increasing the number of graduates who will go into research and public health work. A more flexible preveterinary program which could be tailored to the background and needs of each student might be of help. The use of the preveterinary scholastic performance as a guide has its faults but is still the best single gauge of future performance.

A most important consideration is one that is particularly difficult to assess—mental and moral stability. If students are chosen on grades alone we are likely to pick up a few erratic geniuses who later reflect discredit. It is important to work closely with the preveterinary college officials concerned with student activities and discipline. We must take every precaution to avoid graduating the hot check artist, the heavy drinker, the chronic traffic violator, or the student who has had a "nervous breakdown." These should not, of course, be denied an education, but should be channeled into pursuits less dependent upon unimpeachable moral and ethical standards (non-medical vocations).

Curriculum. This is perhaps our greatest current problem other than finances. Where shall new material continually being added to veterinary knowledge be placed? What can be discarded from our crowded curriculums? What can be done about increasing pressure for specialization at the undergraduate level? Can we afford to lengthen further the time required to earn the D.V.M. degree? Is compulsory internship really the answer? What about evening and Sunday classes? Shall we relegate more and more course material to the postgraduate level?

These and many other questions plague veterinary colleges today. But perhaps the most haunting question is one which hangs over not only the veterinary colleges but every technical institution of higher learning. In the zeal to turn out a better-trained veterinarian, is his education neglected? Are we turning out technicians rather than thinkers? Curriculums contain more and more science; less and less of the humanities. With every revision of lecture notes instructors add more scientific information to be funneled into the student. This is not a trend peculiar to veterinary medicine. It exists in all the sciences, and its consequences may in the long run be disastrous. Are we to be doomed to the production of veterinarians who are more and more able to cope with disease and less and less capable of living with their fellowmen in the lengthening shadow of the H-bomb? Is our destiny being mapped by first-rate physicists, first-rate militarists, first-rate industrialists—yes, and first-rate veterinarians—in combination with second- or third-rate statesmen and political thinkers?

Aside from this consideration I think we can say that today's veterinary colleges are doing an excellent job. Most have made more progress during the past ten years than in the 25 years immediately preceding. Particularly remarkable has been the rapid development of newer schools which were established after World War II. Much of the progress of the past ten years of course must be credited to the Council on Education of the A.V.M.A. As an educator, I know of no college accrediting agency which has pursued a wiser, and as a result a more effective, course in its dealings with college and university administrations. The veterinary profession owes this unsung Council a debt of gratitude for doing so well such a delicate and influential job.

Planning for the Future

Those of you who attended the convention in Cleveland last August heard Brig. Gen. Wayne O. Kester, then president of the A.V.M.A., outline a 29-point "blue-

print" for the future of the Association. Your Executive Board and Board of Governors of course, assisted General Kester in developing this comprehensive, forward-looking program. And while I am sure each of those 29 points can not, should not, be undertaken immediately, I am equally convinced that all of us can enthusiastically subscribe to the General's program as a guide to the development of a greater, more effective national organization.

After two years of intimate association with the Chicago office, General Kester concluded that we have a competent, loyal, efficient, but overworked headquarters staff. I can emphatically support his conclusion.

General Kester pointed out that the recognized need for closer liaison between the A.V.M.A. and constituent associations can not be taken care of simply by mailing out more carbon or mimeographed copies from the Chicago office. On first consideration, this might seem to be the solution, and no doubt it would help. But our headquarters staff already is so bogged down in routine and detail work that it can not do an effective job of over-all or long-range planning. Also, a discouragingly small percentage of "general mailing" material is actually read by the recipient, particularly if it is voluminous. But the most important reason that our liaison can not be improved much by mail is that liaison is a two-way proposition. And veterinarians, particularly busy practitioners, are notoriously poor correspondents.

It appears then, that General Kester suggested the obvious solution: One or two full-time, traveling secretaries who could attend meetings of constituent associations, bring them word of A.V.M.A. programs, see first-hand problems of constituent associations, and carry these back to the A.V.M.A. central staff for their information and help.

Some will say that these are functions of the president and president-elect. Under present conditions they are, but they should not be. These liaison functions we have been talking about should be handled by full-time A.V.M.A. staff members with some experience on the job to insure continuity. The president and president-elect are elected officials who have other full-time jobs to which they must give first priority. They serve only one year in each office. If, as was true in my case, they have had no prior experience on the Executive Board, they require at least two years to become familiar enough with the details of the organization to serve effectively in a liaison capacity. By this time their term of office is over.

Symbol of Leadership

The president of the A.V.M.A. should be a symbol of leadership and serve largely in a public and professional relations capacity. He should be particularly effective as the official representative and spokesman in dealings between the veterinary profession and other professions and with the public. I might add that this is the area of our public relations which is most in need of development. A lot of time is spent at meetings such as this in telling ourselves how important we are, how versatile our profession, and how vital to the national welfare. These are things we should be telling the other 200,000,000 people in North America; our 20,000 veterinarians already know it.

The General's program is an ambitious one. But it is a splendid program to which I heartily subscribe and I hope you will, too. If you are not familiar with the details of his plan, see the September 15, 1957, issue of the *Jour. Am. Vet. Med. Assn.* in which the full text of his address was printed.

To put any of this ambitious program into effect will require an increase in dues. But this will come as no surprise since you have become accustomed to the increasing cost of everything around you. It costs more today to do the same thing you did five years ago. This increased cost of just standing still has been taken care of up to now by our growing membership and by increasing income from the *Journal* and other services. In order to continue to grow and improve, your A.V.M.A. must have more money. I hope you will recognize the need and give your ungrudging support.

Your Stake in the A.V.M.A.

Although we live in a society of human beings and, ostensibly, subscribe to the democratic principles of self-government, many of us curiously avoid taking an active part in the government of our professional society. Our nonparticipation usually takes one of several manifestations:

1. Complete lack of interest.

2. Belief that a group of superior brains are "looking after things."

3. Belief that a small clique—usually referred to as "the home office"—has taken over and is running the show to suit themselves and, *ipso facto*, is running it wrong or poorly.

These views not only are erroneous but also dangerous in the extreme. Let's examine each of them.

1. *Lack of Interest.* This is perhaps the most dangerous of the three. Too many veterinarians are in the habit of submitting to, instead of participating in, association leadership. It is true in association as well as in national politics that a vacuum will not exist for long. If competent men are not available for, or interested in, positions of leadership, these positions will be filled by incompetent men.

2. *A Group of Superior Brains are looking after Things.* This is a popular evasion but also dangerous and likely to be untrue. With advancing age comes the unnerving realization that the committees, councils, and boards which we once stood in awe of, actually are composed of quite ordinary people, many of whom are no wiser than you and I. In the effort to "look after" our profession all of us must be concerned and each has a definite contribution to make.

3. *A Small Clique has Taken Over and is Running the Show.* Older members and long-term officers of any organization are particularly vulnerable to the charge that they are "running" that organization. Because of their permanence and their experience, they are naturally looked to for guidance and continuity. If they are allowed to "take over" it is the fault of the membership. The constitution of the A.V.M.A., like that of any democratic organization, provides safeguards against any small group "taking over." But the safeguards are built on the principle of active, interested participation by all members.

My own election as president-elect of the A.V.M.A. illustrates this point. I was elected by a majority of votes cast at the San Antonio convention. But only about 40% of those present voted. Naturally most of my support came from friends in the southwest. One can not help but wonder whether, if everyone present had voted, you might have had a different, and better qualified, president.

So you see you are the A.V.M.A. and how you perform will determine its future importance, prestige, accomplishments, and member benefits. And if you find yourself opposed to any of its policies or actions, get busy and work for a change. Real progress will depend on united effort, not divided sulking.

American College of Veterinary Toxicologist

Considering events and trends in the use of toxic chemicals in agriculture and livestock production, the organization of the American College of Veterinary Toxicologist has special significance.

Many diagnostic laboratories now have trained toxicologists on their staffs and consider their role an essential one. Organization of this group will assure further development of the science, standardization of technics, and keep practitioners advised of potential hazards of new chemicals.

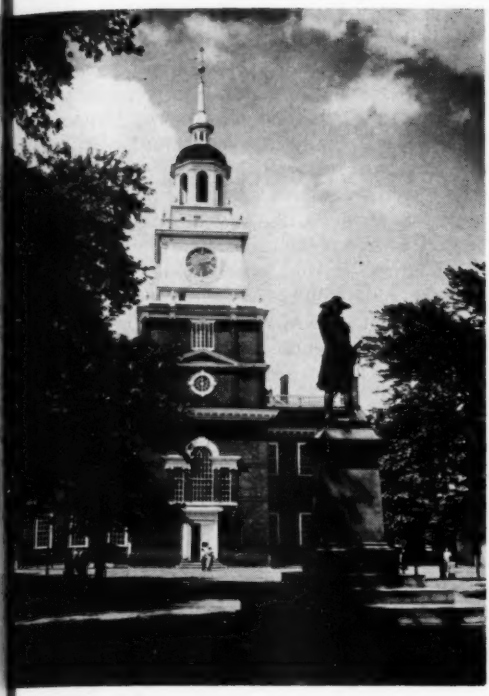
Qualified veterinarians desiring charter fellowship status in this college must have applied for such fellowship by Dec. 31, 1958. Application should be addressed to the secretary, Dr. William F. Harris, 1102 East Main St., Payallup, Wash.

A.V.M.A.

95th Annual Meeting

August 18-24, 1958

Philadelphia, Pennsylvania



Independence Hall in Philadelphia is within easy walking distance of many landmarks in the Old City. The statue of John Barry (lower right of cut) pays tribute to the Father of the American Navy.

The "City of Friends" will be host to the 95th annual meeting of the American Veterinary Medical Association, Aug. 18-21, 1958. A city of many "firsts" in history, Philadelphia is rich in opportunity for pleasure, historical knowledge and scientific advancement.

A veterinary "first" took place here when Dr. Robert Jennings and several of his colleagues formed the American Veterinary Association, May 17, 1854, in Philadelphia, nine years before A.V.M.A.'s official birth in New York 1863. The A.V.M.A. has met six times in the city of William Penn, the last time in 1927.

Philadelphia continues to contribute to the science and art of veterinary medicine through the School of Veterinary Medicine, University of Pennsylvania.

Founded 278 years ago, the city of Philadelphia housed the First Continental Congress in Carpenter's Hall in 1774, the year before the embattled farmers stood up to the British at Lexington. Independence Hall was the seat of government during the Revolution and up to 1800 when the capitol was moved to Washington, D. C., 125 miles away.

In recent years, the City has renovated many of its historic landmarks and established an area of two square miles known as Old City. Within walking distance of the downtown hotels, the oldest street in the United States, Elfreth's Alley, Carpenter's Hall, Independence Hall, and the home of Betsy Ross are included in Old City.

The past, present and future of Philadelphia are dramatically portrayed in an exhibit at the Convention and Trade Center which will house the scientific meetings of the A.V.M.A. Convention.

This year, members, their wives and other convention attenders will have an opportunity for post-convention tours through Happiness Travel Service to New York City and Bermuda. An illustrated folder on these trips will be mailed to all A.V.M.A. members. Other veterinarians and their wives can obtain a folder by writing the Association's headquarters in Chicago, Illinois.

Animal Health

R. R. DYKSTRA, D.V.M.

Trolene for Cattle Grubs

It is well to remember at this time of the year that the USDA has announced that cattle grubs (*Hypoderma lineatum*) can be prevented from developing within cattle by chemical means. The chemical recommended is an organic phosphate (O.O-dimethyl o-2-4, trichlorophenyl phosphorothicate) usually known as Dow ET-57. Commercially designated trolene (former and now obsolete name was viozene) this new agent has been approved by the Federal Food and Drug Administration as a systemic cattle grub killer. Tests at the Iowa and Nebraska Agricultural Experiment Station indicate that treated cattle make better gains; probably because the irritation due to the grub is removed. The remedy is administered in bolus form. Its action is systemic as it destroys the grubs before they reach the back. The best time to treat is late summer or early fall.

Aerosol Vaccination

An opportunity recently presented itself to participate in a discussion with several veterinarians relative to the merits of spray vaccination of chicks. All were interested and engaged in poultry practice. The discussion concerned induction of immunity against Newcastle disease and infectious bronchitis.

The method of spray vaccination follows quite closely that discussed by Dunlop and Strout in Station Bulletin 416 of the University of New Hampshire Agricultural Experiment Station, Durham, entitled, Avian Mass Immunization for Infectious Bronchitis and Newcastle Disease.

The veterinarians indicated that flocks of chicks treated by them were small but that by older methods of wing web and intranasal vaccination, handling was time consuming. By the spray method, employing a hand fly sprayer, combining vaccines developed for the two respiratory diseases, can be administered to chicks in the hover or older birds at roost. Only a few minutes are needed to complete the job. They all preferred three-day-old chicks though occassionally older birds were treated. These practitioners gave no attention to the existence or nonexistence of parental immunity. Vaccination of chicks via aerosol carried them safely to the broiler age, but for those intended for production or breeding purposes, vaccination was repeated at approximately 20 weeks of age. Originally these practitioners used Newcastle B_1 strain, and a field strain of infectious bronchitis virus prepared after several embryo passages. These were diluted before use with buffered saline solutions. Reactions are usually mild and mortality rate under 2%. Flock owners were pleased with results.

Determination of Ovulation Date

At the time of ovulation in human females, glucose is apparently present, for a few days, in the secretions of the uterovaginal cervical canal. Glucose will react with the specific enzyme glucose oxidose (glucosidase) to result in a blue coloration. Plastic sticks with cotton tips — the latter impregnated with the enzyme are inserted daily for five minute periods into the canal. Approximately two days before ovulation occurs there is a faint blue coloration which becomes of maximum intensity in the day of ovulation, and then fades in two to three days.

It is suggested by the writer of this column that in cases of so-called "silent heat" in cattle, if the approximate time of the heat period is known, that daily tests of a kind similar to that described in this paragraph could be of value as a guide in the artificial insemination of such animals. This is purely a suggestion that probably will require some basic research.

Nutrition

MORRIS ERDHEIM, D.V.M.

Ruminant Nutrition

Since ruminants can utilize roughages as sources of energy, feeding programs must be based around roughages. These feedstuffs are inexpensive and readily available. Home-grown grains may also be available. Adding these together (roughages and home-grown grains), it is recognized that while they supply energy, they lack other nutrients and are, therefore, not completely balanced feeds. This combination is likely to be low in (1) protein, (2) vitamins (vitamin A in particular), and (3) minerals.

To compensate for these deficiencies, a supplement must be designed to balance the feeding program. This supplement would be a high protein mixture (30% or higher). It should be fortified with vitamin A to provide adequate levels. It should also contain adequate levels of minerals and trace minerals. Generally, such supplements are fed at the rate of 1 to 2 lb. per head per day, which will adequately balance home-grown grain and roughages fed on the farm.

These supplements should not be referred to as proteins since they are much more than protein supplements. Actually protein supply for ruminants is far less critical than for single-stomached animals. In supplying proteins for hogs, the aim is to supply a proper balance and adequate levels of amino acids. Therefore, an appropriate combination of ingredients is selected.

Protein for Ruminants

Rumen microorganisms are capable of utilizing nitrogen from almost any source and resynthesizing it into amino acids for its own needs. The nitrogen may come from natural protein or from non-protein sources, like urea. Therefore, it is not so important to balance protein in the feed for cattle or sheep. As long as a source of nitrogen is provided, rumen microorganisms will do the rest.

Urea is a perfectly acceptable ingredient for cattle. It must be used with some precautions, otherwise, toxic symptoms may develop. A source of readily available energy must be included in the feeding program when urea is fed. It should not contribute more than one-third of the protein in a feed. More has been used successfully, but the one-third figure is the accepted safe practice. Under present usage, virtually no urea toxicity occurs. Before a diagnosis of urea poisoning is made, the practitioner would be well advised to review the case thoroughly and look for other possible causes of symptoms.

Vitamin A

Vitamin A deficiency is a relatively common problem. Sub-clinical cases are missed by the diagnostician, but represent significant economic loss to livestock producers. Under ideal conditions, cattle can get all the vitamin A activity they need from the carotenoids in forages. Good quality alfalfa hay is abundantly supplied with carotene which is converted to vitamin A by the animal.

Unfortunately the quality of hay or pasture supplied under general field conditions is far poorer than most producers recognize or care to admit. Moreover, cattle are inefficient converters of carotene to vitamin A; about one-third as efficient as other animals. The net result is a degree of vitamin A deficiency. This is why a good cattle supplement should include vitamin A.

Minerals

Minerals have long been used in cattle feeding. Much of this practice was based in the past on the "learned counsel" of the itinerant mineral peddler. However, this field is now receiving much attention by nutritionists, and mineral feeding is on a much sounder basis. While the calcium-

phosphorus ratio is rather specific for other classes of stock (about 2:1 or narrower) cattle can tolerate a wider margin. Indeed, good alfalfa which would sustain cattle has a calcium-phosphorus ratio of 6:1.

Cattle can utilize phytin phosphorus, the form generally found in plants. Single stomached animals can not. Feed formulae prepared for the latter group must provide an inorganic source of phosphorus which is more readily available.

In specific areas, trace mineral supplementation can help overcome local problems. In the goiter belt, iodine should be provided. In other areas, additional copper may be included in the supplement to help counteract molybdenum. Cobalt is needed in still others.

Other Materials

Many supplements now contain other materials for growth promotion. These include stilbestrol, sources of rumen factors to help increase cellulolytic activity, antibiotics and chemobiotics. Stilbestrol is not effective when fed with an inadequate ration. The protein level must be up. Stilbestrol will not produce results on poor range unless properly supplemented.

Rumen factors are receiving attention both in the laboratory and the research feed lot. These are unidentified factors which appear to assist rumen microorganisms digest cellulose. This is of great importance economically, since it means that cattle can make better use of poor quality roughages. Such rumen factors are found in the ash of alfalfa, fermentation products, and molasses. Work with the artificial rumen indicates that a combination of the alfalfa ash factor, vitamin B and fermentation products has greater cellulolytic activity than any of these used alone. Under natural conditions rumen microorganisms manufacture enough vitamin B to satisfy their own needs for cellulolytic activity. Under stress conditions, this may not be true.

Feed Additives for Fly Control

Preliminary trials involving two chemicals suggest that they might be effective in fly control in cage layer operations. The method of use of these two chemicals is as additives in the feed. Quisenberry, Ryan, and Price of A. and M. of Texas conducted two trials during the summer of 1957 with Trolene* (Dow) and Polybor-3** (Pacific Borax).

Birds were housed in cage batteries in a conventional cage layer house with maximum exposure to flies. The 36 White Leghorn hens were divided into 12 lots of three birds each. Two lots served as controls and the remainder were fed varying levels of Trolene and Polybor-3 mixed in the feed.

Results from these trials suggest that Polybor-3 might be effective in a fly control program when fed to birds in their feed. The level which seems to be adequate for satisfactory fly control falls between 3 to 6 lb. per ton of feed.

The Trolene appears to be ineffective as a fly control agent fed at levels as high as was economically feasible.

Recommendations

Much more testing needs to be done with both of these chemicals. Others are also being considered. Some of the problems in this approach are: 1. The effect of droppings from treated birds when used as fertilizer, on the growing plants. 2. Tolerance of the birds for these chemicals. 3. Residual levels of these chemicals in eggs and poultry meat.

While these questions are being answered, it appears that the feed additive list will probably be increased; in this case additions designed as fly control agents.

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*Trolene, Dow Chemical Co., is also known as ET-57, now being tested for grub control in cattle.

**Polybor-3 (disodium octa borate tetrahydrate-$Na_2 B_8O_{13}$-4 H_2O) is manufactured by the Pacific Borax Company.

Screwworms are a century-old pest in the southwest. They have been known in Texas since 1843. They also occur in Arizona, California, and New Mexico. Infested animals brought the screwworm to the southeast in 1933.

Practitioner's Laboratory

W. L. SIPPEL, V.M.D., Ph.D.

Florida Livestock Board
Kissimmee, Florida

Sedimentation Rate

The hematocrit test or packed red blood cell volume was discussed last month. (See VETERINARY MEDICINE, 53:278 [May], 1958) Three additional tests that can easily be run concurrently are the sedimentation rate, the icterus index, and observations on the buffy coat.

Sedimentation Rate

The determination of the sedimentation rate falls in naturally with the hematocrit test. It can be performed in the conventional Wintrobe tube or in the heparinized capillary tubes used in the high speed hematocrit centrifuges.[5] It is convenient to fill two tubes, using one for the hematocrit test and the other for determining the sedimentation rate.

After filling the tubes as previously described[6] (closing one end of the capillary tube with sealing wax or in a flame), they are placed in as nearly a perfectly vertical position as possible and the distance of fall read each 15 minutes for one hour, or at the end of one hour. The Wintrobe tube is graduated in millimeters for a distance of 10 cm. Readings of the distance of fall can, therefore, be made in millimeters directly from the tube. With the capillary tube method, the distance of fall must be measured. As these tubes are only 75 mm. long, the distance of fall in one hour will have a different significance than in the longer Wintrobe tubes. Published sedimentation rate values for animals in this country are usually based on the Wintrobe tube reading. No values equating the sedimentation rate in capillary tubes to those in Wintrobe tubes have come to the author's attention. Experience with capillary tubes should furnish this information. Gradwohl[6] has suggested that the results, by any method, should be reported as "normal," "fast," or "very fast."

Wintrobe[7] warns against too concentrated anticoagulant, delaying more than two hours after drawing the blood before performing the test, and using blood at temperatures outside the range of 22 C. to 27 C. (71.6 F. to 80.6 F.).

The rate of sedimentation is controlled by complex variables of the plasma. The volume relation of the various plasma proteins to each other apparently affects the rate of sedimentation of the cells. Fibrinogen accelerates the rate. Physical factors accelerating the rate are rouleau formation by the red cells and tilting the tube.

The rate of sedimentation is increased in anemias and Schalm and Wood have suggested using (for dogs) a correction chart advocated by Wintrobe and Landsberg[7] correcting to a "normal" value of 45 mm. for both sexes. It is necessary to have both the hematocrit and sedimentation values to use the chart.

Coffin[4] lists the normal sedimentation rates (Wintrobe) for the various species as follows:

Cattle	0 in 60 minutes
Sheep	0 in 60 "
Swine	1-14 in 60 "
Dogs	5-25 in 60 "
Horses	15-38 in 20 "

Significance of Accelerated Sedimentation Rate

"The sedimentation test is a nonspecific reaction which may be compared with the body temperature, the pulse rate, and the leukocyte count, in that it gives information of a general character" — Wintrobe.[7] Generally speaking, the sedimentation rate is

increased in conditions resulting in a generalized inflammatory response. Schalm and Wood[9] indicate that in the dog, the rate is increased in distemper, infectious hepatitis, leptospirosis, abscesses, pneumonia, pleuritis, peritonitis, malignant neoplasia, filariasis, and chronic interstitial nephritis. When young dogs are presented with vague complaints, a rapid sedimentation rate indicates a careful examination for one of the above conditions should be made. Under these conditions, some practitioners administer distemper-hepatitis antiserum and broad spectrum antibiotics until a more definite diagnosis or improvement becomes apparent. In swine, cholera, pneumonia and eperythrozoonosis consistently produce rapid sedimentation rates. The test is of little value in cattle due to the very low rate of sedimentation. Ferguson[10] has described a seven hour test for cattle, but this interval is probably too long to encourage use of the test.

Discussion concerning the icterus index and buffy coat layer will appear in VETERINARY MEDICINE for July 1958.

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Symposium on Regulatory Veterinary Medicine

The annual work conference for state and federal regulatory veterinarians held each year during the American Veterinary Medical Association convention is scheduled this year to be a symposium on regulatory veterinary medicine, it was announced by Dr. Ralph A. Hendershott, Secretary of the U. S. Livestock Sanitary Association. The symposium will be held in the Front Lobby, Convention Hall, of the Philadelphia Convention Auditorium on the afternoon of August 19 and the morning of August 20. The symposium is under the co-sponsorship of the U. S. Livestock Sanitary Association and the Agricultural Research Service in cooperation with the American Veterinary Medical Association. The program has been arranged by a special committee appointed for this purpose by the president of the U. S. Livestock Sanitary Association, Dr. John G. Milligan.

Highlights of the program will be addresses by Dr. B. T. Shaw, administrator of the Agricultural Research Service, on animal health and American agriculture; and Mr. Albert K. Mitchell, prominent New Mexico cattleman, on animal disease eradication and its benefits to the producer. On the morning of Aug. 20, a discussion of the role of regulatory veterinary medicine in the atomic age will be of particular interest, especially the discussion of peacetime uses of irradiation as illustrated by the screwworm eradication program now being carried on in the southeast, and plans for the use of irradiation in the preservation of food.

The proceedings of the symposium, which are expected to be available shortly after the convention, will be distributed to state and federal regulatory agencies, schools and colleges of veterinary medicine, and a limited number will be available for distribution to other persons. It is intended that the proceedings will provide a long-needed outline for the conduct of regulatory veterinary medical programs.

The committee in charge of arranging the program consists of Dr. Frank A. Todd, chairman, who with Doctor Milligan is serving as cochairman of the symposium, Dr. C. L. Campbell, Dr. R. W. Smith, Dr. A. P. Schneider, Dr. A. R. Miller, and Dr. C. D. Van Houweling.

Distaff

MRS. E. F. (HAZEL) EBERT

The Telephone

There is nothing in this world as innocent or foredoomed as the veterinarian's wife who has her hands in pie dough or roll mix. Invariably the phone rings.

The two thoughts the veterinarian's wife has about the telephone are: (1) Why doesn't it ring?, and (2) If that phone rings again before I get this pie in the oven, I'll scream and tear it off the wall." Well, we do not scream or tear it off the wall. We simply answer as quickly and placidly as possible: "Doctor Smith's office," or "Doctor Smith's residence."

By placidly I do not mean with the soft, whiney voice common to a case of vitamin deficiency complicated by coryza. Our voices reflect our personalities as much as the words we speak. Tone, pitch, and volume are qualities that can be improved with a little understanding of their importance.

Client Relations

My husband used to have a client in a small village near Kansas City who hardly required a telephone to send a message very far. I will always remember her voice invading the receiver with all the delicacy of a rat tail file on a sore tooth. "This is Mrs. Jones from *Outlandish*." I am certain her voice could have been heard welling out from the receiver by innocent bystanders on the street outside. I was fond of her, and she was a nice person, but I soon learned to hold the receiver a discreet distance from my ear when talking to her.

Many times the wife of a client will call, which tends to form a basis for good client-relations if the doctor's wife responds with a friendly voice that expresses sincere interest in a problem. It is well to inquire about the family, their health, and their activities if opportune. One must estimate accurately, too, the degree of urgency in responding to the call or the possible seriousness of a situation on a farm.

I have always loved children, and I have always asked about them in particular—their health, their school activities, their scouting and 4-H work.

I have received many a good recipe and hint for a short cut in work over the telephone while talking to a client's wife.

Radio-Telephone and Two-way Radio

The radio-telephone or a two-way radio has largely eliminated the necessity for calling clients and asking them to deliver messages to the doctor. And yet there are times when this is necessary, either because such equipment is too expensive or not important enough in the practice. Farmers and their wives are usually happy to cooperate, a sort of "doing a good turn," even to the extent of stopping the veterinarian as he makes his way down a country road. Most clients learn to know the veterinarian's car and are glad to flag him down and give him a message.

The miracle of radio-telephone communication has not altered the accepted value of projection of personality via telephone and use of recommended telephone technic developed by the doctor's wife. The marvel of this communication service available to most everyone and now taken for granted has often been misused. Most of us, I am sure, have had unpleasant experiences to which we have reacted in the negative after telephone contacts. No client need ever be lost because of careless or hurried response to a telephone call.

The telephone offers a media for liasion, whether professional or social, between the client and his veterinarian. All contacts ought to be thoughtfully approached to help build a confident client-doctor relationship.

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Use Recommendations

Beef Cattle—Malathion sprays can be applied on cattle for control of lice, ticks and horn flies. In back-rubbing devices, malathion is effective against lice and horn flies. Malathion should *not* be used on lactating dairy animals or on calves under one month of age.

Here cattle are being sprayed for lice. Ticks and horn flies, when present, are also controlled.

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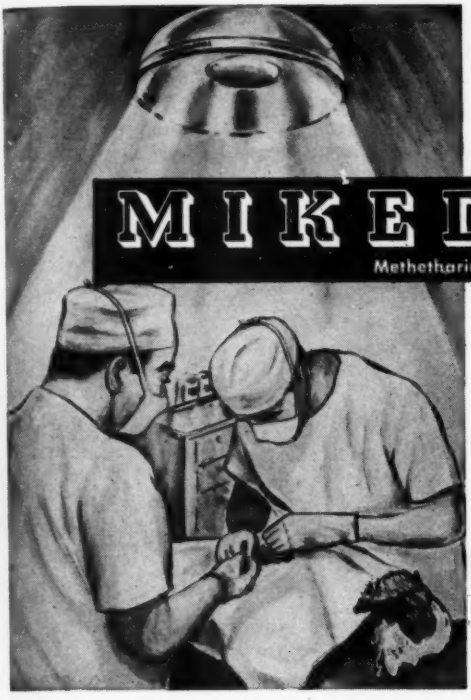

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To Head Diagnostic Laboratory

Appointment of Dr. Matthew J. Eggert as head pathologist, in charge of the Animal Disease Eradication Division's Interim Animal Diagnostic Laboratory at Iowa State College, Ames, effective December 2, 1957, has been announced.

Dr. Matthew J. Eggert

His responsibilities in his new position in Ames, include the supervision of the Division's laboratory services in the fields of diagnostic bacteriology, virology, serology, and histopathology; planning and development of the laboratory phases of epizootiological studies of brucellosis, tuberculosis, scrapie, trichinosis, and other animal disease problems of national interest; and assisting in the planning of the USDA's Animal Disease Laboratory at Ames, to which the interim diagnostic laboratory will later be transferred.

A native of Newark, N. J., Doctor Eggert received his D.V.M. degree from Ohio State University in 1933.

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Dr. Leland C. Grumbles Named to Texas A. and M. Post

Dr. Leland C. Grumbles

Dr. Leland C. Grumbles has been named head of the Department of Veterinary Microbiology at Texas A. and M. College, according to recent announcement.

Doctor Grumbles was awarded a D.V.M. degree in 1945 and M.S. degree in veterinary microbiology in 1957 from Texas A. and M. College. He did graduate work in bacteriology at Rhode Island State College under the late Dr. John P. Delaplane in 1947.

After one year in private practice Doctor Grumbles joined the staff of the Department of Veterinary Science at Rhode Island State College in 1947. In 1948, he was named an assistant professor in the Department of Veterinary Science at Louisiana State University. He returned to Texas A. and M. College in 1949 as associate professor and has been on the staff since that time.

He was granted military leave to serve with the Veterinary Corps, U. S. Air Force and spent most of his tour in Alaska where he carried on research in diseases transmissable from animal to man.

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Twenty-five words or less, $3.50—minimum charge; additional words 10 cents each. Replies sent care VETERINARY MEDICINE. 50 cents additional to cover forwarding postage. Remittance must accompany order.

Names of classified advertisers using V. M. key numbers can not be supplied. Address your inquiry to key number care VETERINARY MEDICINE, Suite 803, Livestock Exchange Building, Kansas City 2, Missouri, and it will be promptly forwarded to the advertiser.

Deadline for copy — 5th of month preceeding date on issue.

For Sale

PRACTICES: One of the best and longest established general practices of small, large animal and poultry. Small animal hospital, well equipped, 26 x 50 ft. and modern eight room residence in northern Ohio. Surgical equipment and drugs for small and large animals for immediate sale and possession. Sale due to sickness, $22,000. cash and balance $16,000. on terms to satisfy purchaser. Address box 509, care VETERINARY MEDICINE.

ANIMAL HOSPITAL: Sacrificing for quick sale, well-established, fully equipped animal hospital. Includes landscaped colonial home. $15,000. needed to handle. Address Box 508, care VETERINARY MEDICINE.

DOG BOOKS: Send for list of dog books. Keep up on all phases of dog fancy. Subscription to Dog World (3323 Michigan Blvd., Chicago 16), $3. one year, $5. for two years.

Wanted

PRACTICE: Interested in buying lucrative small animal practice — Mass., New Jersey, Penna., Maryland, and Virginia. Mature, responsible individual. Details first letter. Address Box 510, care VETERINARY MEDICINE.

VETERINARIAN: Wanted in large animal practice leading to partnership. Located in Midwest. Address Box 505, care VETERINARY MEDICINE.

VETERINARIAN: June or recent graduate wanted as assistant veterinarian in small animal practice in Chicago. Address Box 506, care VETERINARY MEDICINE.

VETERINARIAN: Steady position, light office work only. Can be retired, or up in years. Must be licensed in state of Maryland. In answering, please state age, family status, salary expected. Address Box 507, care VETERINARY MEDICINE.

Services

CLIPPER BLADES SHARPENED: Polished, guaranteed equal to new; 75 cents per set. Complete repair service for Oster Clippers. Southern Clipper Service, P. O. Box 1842, High Point, N. C.

CLIPPER BLADES: Precision ground and sharpened like new — 75 cents a set; shears 60 cents. Quick Service. Professional Grinding Service. P.O. Box 9391 M., Greensboro, N. C.

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Gas Fired
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Engineered special for the Veterinary Practitioner

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CAPACITY 6 BU.
FEED DOOR 21" x 19"
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Great heat and firepower
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MANY IN USE
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Investigate unique purchase plan for great saving.

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Quick relief for Bone, Bursal or Tendon Lameness
Single Bottle.....$2.00
3 and 1 free.....5.00
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12 and 4 free.....17.00
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CARTER-LUFF CHEMICAL CO.
Hudson, N. Y.

Positions Wanted

VETERINARIAN: Now engaged in Illinois mixed practice desires position with drug manufacturer involving clinical research, product development, and professional relations. Address Box 511, care VETERINARY MEDICINE.

Magazines

VETERINARY MEDICINE: January and February 1958 copies wanted. Your subscription will be advanced one month for each copy. Mail to VETERINARY MEDICINE, Suite 803 Livestock Exchange Bldg., Kansas City 2, Missouri.

Gaines Award

The Gaines Award, sponsored by the Gaines Dog Research Center, and administered by the AVMA was established in 1956 and first offered in 1957. There was no recipient last year. It consists of a gold medal and $1,000. in cash.

The award will go to that veterinarian whose work (within the preceding five years) in either clinical work or research in the basic sciences is judged to have contributed significantly to the advancement of small animal medicine and surgery.

The work or achievement shall have been published in recognized veterinary periodicals or presented at a professional meeting.

Nominations may be made by anyone. Each nomination shall include a description of the work done by the veterinarian nominated, a statement of how it has contributed to the advancement of small animal medicine and surgery, a pertinent bibliography of the nominee's published work, if any, and biographical information.

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You'll do better with Oster
the Veterinarian's clipper
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Indicated in conditions of weakness, unthriftiness, emaciation and other manifestations of avitaminosis in calves, colts, lambs, baby pigs, puppies and kittens.

Also useful in prepartum "downers,"

Dose — 1 to 3 cc. — daily for 2-3 days.

Packages: 30 cc. diaphragm stoppered vial;
6 vials in two-tone plastic box

Write for literature

order direct or from your nearest CURTS distributor

CURTS Laboratories, Inc.

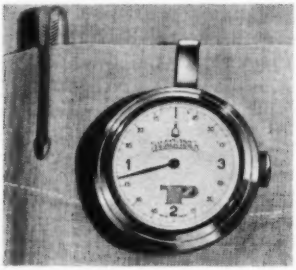
Manufacturers of Veterinary Pharmaceuticals Since 1918

71 Central Avenue Kansas City 18, Kansas

This department will announce each issue new therapeutic items, equipment, services, and literature of interest to veterinarians. All claims made are those of the firms concerned. Send communications to the address noted.

Reader's Service

A Reminder Timer that clips to a doctor's pocket and is no larger than wristwatch can be set for five minutes up to four hours and buzzes at preset intervals. This instrument is finished in polished chrome and sold individually boxed. For price ask Arista Surgical Co., 57 Lexington Ave., New York 10, N. Y.



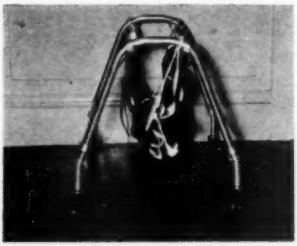
Arista Surgical Co.

Botulism in Mink can be prevented with an alum-precipitated, formalin-killed whole broth culture of *Clostridium botulinum* type C vaccine. It immunizes mink against botulism resulting from the consumption of contaminated raw meat. For dose and availability, ask American Cyanamid Company, 30 Rockefeller Plaza, New York, 20, N. Y.

Hidden Menace is a sound, color film that tells the story of pest and disease traffic from country to country, with emphasis on agricultural losses. It is 16 mm., 23 minutes in length, has TV clearance, and is available for use by veterinary associations and civic groups through film service libraries of state agricultural colleges.

Answers to **Questions that Bankers Ask,** in summary form, are available as a short pamphlet, Financial Statements for Bank Credit Purposes, published through the cooperation of the accounting and banking professions. Copies may be obtained by writing to The American Institute of Certified Public Accountants, 270 Madison Ave., New York 16, N. Y.

A Dog Walker designed to retrain paraplegic pets to use their muscles and walk again is now available to the profession. Manufactured by the Oxford-Universal,



H. C. Burns Co.

2020 Kearny St., El Cerrito 6, Calif., the walker is available from the H. C. Burns Co., P. O. Box 1527, Oakland 6, Calif.

Calf Scours which resist treatment by conventional antibiotics can be controlled with Stereocide, a new compound containing a European discovered chemical and broad range antibiotic. The new compound treats all four dangerous elements of scours: Bacteria and fungus infection, spasms, electrolyte loss, and fluid loss. For details ask Jensen-Salsbery Laboratories, 21st and Penn Sts., Kansas City 41, Mo.

Sterile Gauze Bandage that conforms to difficult body areas and permits mobility of all wrapped joints is a valuable aid to veterinarians for bandaging pets. The pro-

Johnson and Johnson

duct does not slip, stretches up to 40% to prevent constriction of swollen areas, and is available in 1, 2, and 3 in. rolls from medical supply houses. Product is manufactured by Johnson and Johnson.

Disposable Head Coverings for surgeons, assistants, or nurses of lightweight, soft plastic material are now being offered at 2

B. H. Jordan Co.

cents. Samples are available by writing to the B. H. Jordan Company, 64 E. 8th St., New York 3, N. Y.

Spray-Band is a spray-on bandage available either as antibiotic water soluble, or waterproof. Antibiotic Spray-Band is indicated for open wound management, infectious skin conditions. Waterproof formula finds application in surgical procedures and whenever wound coverings must withstand perspiration, body fluids, or submersion. For details ask Schueler & Company, 75 Cliff St., New York 38, N. Y.

BEAVER BLADES for VETERINARIANS

Six conventional shape blades designed for a wide variety of surgical uses. Manufactured of the finest quality, high carbon Swedish steel, the blades are honed to extreme sharpness to reduce operative bleeding and trauma to soft tissue. Each blade locks easily and securely into a standard Beaver handle manufactured of solid nickel-silver and designed to be held with comfort even during the longest operations.

Precision workmanship insures long life for both blades and handle. Satisfaction is guaranteed, for Beaver surgical blades have been used for years for all types of animal surgery.

No. 7 Handle (Nickel-silver) **$1.25**

No. 8 Handle (Stainless Steel) **$2.00**

Blades, per doz. **$1.50**

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KENNELS

Fibreplex Kennels are superior one-piece molded fibreglass kennels, designed and engineered to the most exacting standards for modern use. Manufactured from selected resins and fibreglass for maximum strength, durability and utility, yet priced amazingly low.

Fibreplex Drying Kennels (Model-J shown above) are an innovation in drying kennel design. Radiant heating is combined with a powerful blower to dry animals rapidly without chilling. This dryer will be an attractive addition to your hospital equipment.

Write Today for Free Literature and Information

FIBREPLEX P.O. Box 14 · NORWALK · CALIFORNIA

Dr. Frank B. Morrison Victim of Heart Attack

Dr. Frank B. Morrison, 70, known to the agricultural world for his book *Feeds and Feeding* died April 7 of a coronary attack.

Doctor Morrison, a world authority on livestock nutrition, was head of the Department of Animal Husbandry at Cornell University for 17 years. He retired three years ago.

Bluetongue in Sheep

Seven western states reported variable incidence of bluetongue in sheep during 1957. Laboratory confirmation of clinical diagnosis was accomplished in four states. A total of 167 flocks were infected. Morbidity ranged up to 43% (average 30%) and mortality to 30% of infected animals. All ages appear to be susceptible and highest incidence is reported during the summer season.

Use with Confidence

THE GREATLY EXPANDED GRAIN BELT LINE...

...now offering a companion line of items composed of formulations which the Veterinarians are using to meet changing times.

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There are Poisonous Snakes in Every State

Wherever you practice, there may be poisonous snakes in the general area, and, in all probability, there are farmers or ranchers who have lost animals through snakebite.

Losses occur more frequently in the southern and southwestern states. In Florida alone for example, during a recent year, 360 domestic animals were treated for snake poisoning. Doubtless, many others died before treatment could be administered.

ANTIVENIN WYETH neutralizes the venoms of all the Crotalidae—including rattlers, copperheads and water moccasins. The serum is highly refined, specially purified, and the potency is precisely standardized. For *all* domestic animals it is life-saving.

Farmers and ranchers look to you for assistance in many forms. In emergencies, your skills and facilities may mean the difference between saving or losing valuable animals. Be sure, therefore, you always have ANTIVENIN* WYETH on hand.

ANTIVENIN WYETH is easy to administer. Each package contains lyophilized Antivenin, distilled water, syringe, sterile needle, iodine applicator and complete instructions.

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as a tranquilizer
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benefits the veterinarian
by providing him with further opportunity to demonstrate his highest degree of professional skill and ability

benefits the patient
by minimizing the danger of self-inflicted injuries and by providing optimal conditions for therapeutic procedures

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by reducing unruliness, apprehension and nervousness in animals for greater ease of handling following therapy without dulling of mental alertness or normal responses

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XVI International Veterinary Congress

The Organizing Committee for the XVI International Veterinary Congress, to be held in Madrid, Spain May 21-27, 1959, recently invited all national veterinary societies to submit suggested topics for the scientific program. This Committee will make formal selection of both subjects and reporters nominated by various national groups. General chairman at Madrid is Dr. Roncan E. Alcazar; general secretary is Prof. Pedro Carda A.

A U. S. Committee of 20 members, under the chairmanship of Dean W. A. Hagan, U. S. member of the Permanent Committee of the International Veterinary Congresses, has been selected to cooperate with the Organizing Committee and to submit suggestions. A meeting was held at Washington, D. C. on April 24 (14 members present) at which preliminary plans were made both as to recommendations for scientific subjects and reporters and also for matters pertaining to official delegates and tour proposals.

The previous International Veterinary Congress was held at Stockholm, Sweden, August 1953.

Public Relations Begin Here

"As I listened to Doctor Grady (Dr. Karl P. Grady Jr., OSU '54, Cincinnati, Ohio) and watched him, I gained a deep respect for the whole profession. His touch was firm but always gentle, and his voice calm and good-natured."—*Marianne Besser, Messenger, Mar.-Apr. 1958.*

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Jen-Sal

see X-ray, page XXVIII

the **ETHICAL** *answer*

in ectoparasitic and nonspecific dermatological conditions

SELEEN®

(Selenium Sulfide, Abbott)

Suspension

Veterinary Examinations

California

The California Board of Examiners in Veterinary Medicine announce that examinations will be held June 9-11, 1958, at the School of Veterinary Medicine, University of California, Davis.

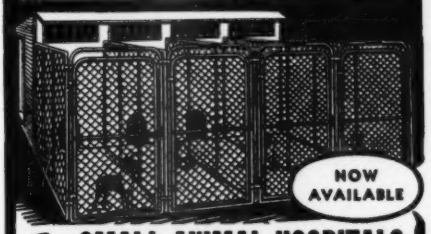
United States Civil Service

The United States Civil Service Commission announces that an examination is now open for filling "Veterinarian" positions in the U. S. Department of Agriculture and other federal agencies in Washington, D. C., and throughout the United States. The entrance salaries range from $5,335. to $10,320. a year.

To qualify, applicants must have had appropriate education plus professional experience. Education alone may be qualifying for positions in grades GS-7, 9, and 11 ($5,335. through $6,390).

Further information and application forms may be obtained at many post offices throughout the country, or from the U. S. Civil Service Commission, Washington 25, D. C. Applications will be accepted by the Board of U. S. Civil Service Examiners, U. S. Department of Agriculture, Washington 25, D. C., until further notice.

MASON'S *New* KENNEL RUNS



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Can be set on concrete or wood floors or directly upon the ground, joining to, or independent of Building. Composed of strong, self-supporting Fence sections and Gate Units with GATES BUILT-IN and Lockable Latches.

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Safe-Dependable-Finest Quality

DIRO PET PRODUCTS

Formulated especially for use and sale by Graduate Veterinarians. Made under the careful supervision of a pharmaceutical chemist to assure highest ethical standards.

FLEA & TICK BOMB—For dogs. Effective against insects resistant to Lindane, DDT, other chlorinated insecticides.

FLEA & TICK POWDER—For cats and dogs. Anti-static. Penetrates coat; allows powder to reach skin. Effective against insects resistant to Lindane, DDT, etc.

FLEA & TICK DIP—For dogs. Modified dip and shampoo. Effective against insects resistant to Lindane, DDT, other synthetic insecticides.

FOAM-BATH—For cats and dogs. All-weather dry bath contains lanolin and other essential oils to help prevent dryness of skin and coat.

DEODORANT BOMB—For Dogs. Bacteriostatic and fungistatic action attacks bacteria-produced odors; doesn't merely mask them. Refreshing fragrance.

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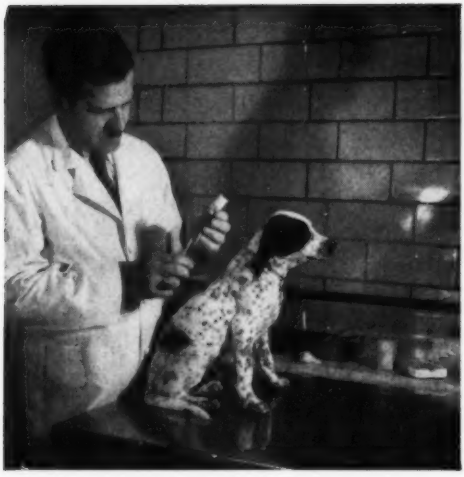

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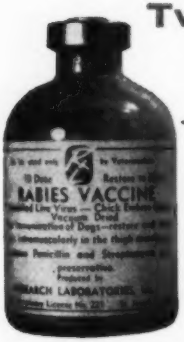
Two Proven Rabies Biologicals Veterinarians Depend on



RL Rabies Vaccine (Modified Live Virus Chick Embryo Origin)

- Produces high-degree immunity which has lasted in field test beyond 3 years.
- Vacuum dried for safety.
- Vaccine reconstitutes immediately upon introduction of the diluent.
- Rigidly tested for moisture, sterility, safety, and potency.
- RL products are sold only to graduate veterinarians.

RL Rabies Vaccine

Modified live virus, chick embryo origin, vacuum dried. Available in 5—1 dose vials (3 cc. dose), 100 pks. of 5—1 dose vials, and 1—30 cc. 10 dose vial.

RL Rabies Vaccine (Phenolized—20% Tissue Suspension)

- For administration in routine yearly vaccination of pets and/or after exposure to the disease.
- A finely ground homogenous suspension of brain and spinal cord from sheep and goats previously inoculated with Fixed Rabies Virus, National Institute P.V. I. of Health Strain.
- Chemically inactivated with Phenol.
- RL products are sold only to graduate veterinarians.

RL Rabies Vaccine

Phenolized—20% tissue suspension. Available in 6—5 cc. single dose, 1—50 cc. multiple dose, 10—50 cc. multiple dose, and 10 pks. of 10—50 cc. multiple dose vials.

RESEARCH LABORATORIES, INC.

Saint Joseph, Missouri

Joins Jensen-Salsbery Research Staff

Dr. Iain Paton

Dr. Iain Paton, formerly practitioner in Scotland's Byrshire County, has been named research veterinarian at the Jensen-Salsbery Laboratories, Kansas City, Mo. He will be working in the special field of parasite control, continuing work in which he became especially interested while practicing in Scotland.

(Advertisement)

Research Reveals Highly Effective Anthelmintic for Cattle

The results of recently intensive clinical research revealed an anthelmintic that is highly effective in cattle. Individual animals were confined in special stalls and administered different phenothiazine drench formulations for testing. All urinary and fecal excreta were recovered and each excretion was individually analyzed chemically to determine how much of the dose went into the digestive tract and amount of the dose available for killing worms. Dosages were given on an identical basis.

GREATER CONCENTRATION

Results obtained from this modified formulation were better than that of unmodified drenches generally used. Tests show that modified formulations produced on the average 6 to 8 times more phenothiazine in the digestive tract in a shorter period of time than other drenches. For example, peak percentages (above 1%) of the modified chemical were obtained in only 17 hours post treatment while the average of unmodified formulations returned a peak percentage of less than .2% 40 hours or later post treatment.

All statements regarding the effectiveness of the above tests are backed by documented experimental data.

Many veterinarians are using this modified formula under the professional label Pro-Brand Improved Cattle Wormer which is sold only to veterinarians. A brochure is available on request. For details write to Pro-Brand Products Company, P. O. Box 4186, Fort Worth, Texas.

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Hydraulic Lift Operating Table

Available as follows:

With white porcelain enameled base and white porcelain enameled top.

With white porcelain enameled base and stainless steel top.

With pastel green porcelain enameled base and stainless steel top.

Top drawn from one piece with round corners; no welding or seams, no sharp edges exposed. Size 22 x 60 inches.

All trim parts are chrome plated

Height of top can be adjusted from a low of 29½ inches to a high of 39½ inches.

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Manufacturers of complete line of veterinary tables—Animal cages—instruments and equipment

Specifically for
RESISTANT INSECT CONTROL

VET-KEM BRAND
INSECTICIDES

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LIVESTOCK SPRAY & DIP

- POTENT
- QUICK KILLER
- LONG RESIDUAL

KEMTOX is highly recommended for control of

- Hornflies
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- Scabies
- Cattle Lice
- Lone Star Tick
- Gulf Coast Tick
- Sheep Keds
- Stable Flies
- Mosquitoes

... and many others

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Veterinary Calendar

Jun. 2- 4. **Michigan Veterinary Medical Association,** Annual Meeting. Grand Hotel, Mackinaw Island. Dr. Charles Coy, Hillsdale, Mich., general chairman.

Jun. 5. **New Castle County Veterinary Medical Association,** The First Regional Conference on the Nitrofurans in Veterinary Medicine. Hotel du Pont, Wilmington, Del.; 9:30 a.m.-4:30 p.m.

Jun. 5- 6. **Texas A. & M. College,** 11th Annual Texas Conference for Veterinarians. School of Veterinary Medicine, College Station, Tex. Dr. R. D. Turk, conference chairman.

Jun. 19-21. **Georgia and South Carolina Veterinary Medical Associations,** Joint Meeting. Bon Air Hotel, Augusta, Ga., Dr. A. Mills, 325 Pinecrest Drive, Athens. Ga., secretary.

Jun. 23-25. **California Veterinary Medical Association,** 70th Annual Meeting. Hotel St. Claire and Civic Auditorium, San Jose, Calif. Mr. Charles S. Travers, 3004 16th Street, San Francisco, Calif., executive secretary.

Jun. 23-25. **North Carolina State Veterinary Examining Board,** Washington Duke Hotel, Durham, N. C. Dr. James I. Cornwell, 65 Beverly Road, Asheville, N. C., secretary-treasurer.

Jun. 24-26. **Maritime Veterinary Associations,** Joint Conference. Mount Allison University, Sackville, N. B. Dr. J. F. Frank, Box 310, Sackville, N. B., general chairman.

Jun. 24-26. **North Carolina State Veterinary Medical Association,** 57th Annual Meeting. The Washington Duke, Durham, N. C. Dr. C. J. Lange, 3741 Hi-Point Road, Greensboro, N. C., secretary-treasurer.

Jun. 24-26. **University of Wisconsin,** Short Course on Diagnosis and Control of Bovine Mastitis. Department of Veterinary Science, University of Wisconsin, Madison. (Registration fee $25.) Dr. C. W. Burch, extension veterinarian.

Jul. 18-20. **Nebraska State Veterinary Medical Association.** Summer Meeting. Kearney, Nebraska. Dr. W. T. Spencer, 1250 North 37th, Lincoln, Nebraska.

Jul. 20-23. **Alabama Polytechnic Institute,** 51st Annual Conference for Veterinarians. Auburn, Alabama. (Housing facilities available for married couples.) Dean J. E. Greene, School of Veterinary Medicine, Auburn.

Jul. 21-23. **Canadian Veterinary Medical Association,** 10th Annual Convention. Royal Alexandra Hotel, Winnipeg, Manitoba. Dr. J. R. Singleton, 613 Dominion Public Building, Winnipeg 1, Manitoba, chairman.

Jul. 23-24. **Iowa State College,** Annual Conference for Veterinarians. Memorial Union, Iowa State College, Ames, Iowa. Dr. John B. Herrick, Ames, Iowa, extension veterinarian.

Aug. 10-12. **Mississippi State Veterinary Medical Association,** 52nd Annual Meeting. Buena Vista Hotel, Biloxi, Miss. Dr. J. W. Patterson, 221 Second Street, Columbia, Miss., in charge.

Continued on page L

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And, there are other traditionally good reasons why there is a preference for B-P RIB-BACK SURGICAL BLADES . . . they are *always* dependable and highly economical in performance.

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A Professional Line product sold only to Veterinarians

Veterinary Calendar

Continued

Aug. 18-21. **American Veterinary Medical Association,** 95th Annual Meeting. Municipal Auditorium, Philadelphia, Pa. Dr. J. G. Hardenbergh, 600 S. Michigan Ave., Chicago 5, Ill., executive secretary.

Oct. 16-17. **Eastern Iowa Veterinary Medical Association,** Annual Meeting. Hotel Roosevelt, Cedar Rapids, Ia. Dr. F. E. Brutsman, Traer, Ia., secretary.

Oct. 26-28. **Florida State Veterinary Medical Association,** Annual Meeting. Galt Ocean Mile Hotel, Ft. Lauderdale, Fla. Dr. A. R. Chambers, 6116 Main Street, Jacksonville, Fla., secretary.

Oct. 26-29. **Southern Veterinary Medical Association,** Claridge Hotel, Memphis, Tennessee. Dr. A. A. Husman, Raleigh, North Carolina, secretary.

Sep. 4- 6. **New York State Veterinary Medical Society,** Annual Meeting. Concord Hotel, Kiamesha Lake, New York. Joan S. Halat, 803 Varick Street, acting executive secretary.

Sep. 28-Oct. 1. **New England Veterinary Medical Association,** Annual Meeting. Dr. C. Lawrence Blackely, 180 Longwood Avenue, Boston 15, Mass., secretary-treasurer.

for Small and Large Animals

Metrazol

A quick-acting, powerful Antianesthetic and Respiratory — Circulatory Stimulant

Prevents and overcomes respiratory and circulatory inadequacy prior to or during surgery. Hastens post-operative recovery. Overcomes shallow respiration and sluggish circulation in old, toxic and debilitated animals when given orally.

Dose: Small animals ½ to 3 cc. METRAZOL by injection, as necessary.
One METRAZOL tablet orally three or four times a day.
Large animals 10 to 25 cc., intravenously, repeated as required.

Available in: Ampules, (100 mg. per cc.) 1 cc., 6's and 100's.
Sterile Vials (100 mg. per cc.) 30 cc. and 100 cc.
Oral Tablets, 0.1 Gm. (1½ grs.) each, 100's, 500's and 1000's.

Metrazol®, brand of pentylenetetrazol, E. Bilhuber, Inc.

KNOLL PHARMACEUTICAL COMPANY ORANGE NEW JERSEY

proven results in these diseases of small animals

CANINE TRACHEOBRONCHITIS (KENNEL COUGH). In one study of 12 cases, FURADANTIN stopped the cough completely within 3 to 7 days.[1]

URINARY TRACT INFECTIONS. Extensively used in human genitourinary tract infections, FURADANTIN has also produced impressive clinical results in the treatment of bacterial nephritis and cystitis of dogs and cats.[2]

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Preliminary data point to new indications for FURADANTIN. Various reports describe encouraging results with FURADANTIN in the treatment of vaginitis in the bitch and genitourinary tract infections of mares.[2] Another article concludes that FURADANTIN is an excellent adjunct to surgery in the treatment of prostatic abscess in the dog.[3]

Like all the nitrofurans, FURADANTIN is bactericidal to a wide range of both gram-negative and gram-positive organisms. It is nontoxic to kidneys, liver and blood-forming organs; and development of bacterial resistance is negligible.

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REFERENCES: 1. Mosier, J. E.: Vet. M. 50:605 (Nov.) 1955. 2. Belloff, G. B.: Calif. Vet. 9:27 (Sept.-Oct.) 1956. 3. Pollock, S.: J. Am. Vet. M. Ass. 129:274 (Sept.) 1956.

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Brucellosis Research

Michigan State University microbiologist Dr. Marvis Richardson reported a significant new approach in the study of brucellosis before the Society of American Bacteriologists.

Doctor Richardson removed living cells from various organs and tissues of a cow, grew them in test tubes, infected them with *Brucella abortus* and observed responses of tissue cells and organisms. This new application of tissue culture technic is certain to advance knowledge of infection and defense mechanisms.

Unlike most bacteria, Brucella actually enter cell bodies and may live within them for months or years. Natural defences and some known drugs are bactercidal for circulating microorganisms and some, but not all, can be reached when intracellular. This point explains to some extent why persons who have been infected may have recurrent attacks of brucellosis extending over a period of years.

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Dihydrostreptomycin	250 mg
Neomycin, as base	100 mg
Sulfanilamide	2300 mg
Sulfathiazole	500 mg
Phthalyisulfacetamide	200 mg
Chlorobutanol	50 mg
Cobalt Sulfate	10 mg
In 11cc tubes:	$39.00 per gross
syringes	43.00 per gross

(27 cents per tube, 30 cents per syringe)

HYDROCORTISONE OPTHALMIC OINTMENT
in 5 gram opthalmic tube

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Dihydrostreptomycin	250 mg
Neomycin, as base	50 mg
HYDROCORTISONE acetate	20 mg
Sulfanilamide	500 mg
Sulfathiazole	500 mg
Chlorobutanol	50 mg
Cobalt Sulfate	10 mg

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syringes 56.16 per gross
(36 cents per tube, 39 cents per syringe)

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EACH 11cc TUBE CONTAINS:

Dihydrostreptomycin	225 mg
Neomycin, as base	275 mg
Polymyxin B Sulfate	50,000 Units
Sulfanilamide	500 mg
Sulfathiazole	500 mg
Chlorobutanol	50 mg
Cobalt Sulfate	10 mg

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Dog with chronic, generalized, bacterial dermatitis. Nose lesion was 4 years old—treated with ointments, antibiotics, lotions and cautery without effect.

Same dog one month later following 5 days' treatment with VARIZYME and POLYOTIC Tetracycline intravenously followed by soothing ointments topically.

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Deaths of Veterinarians

WILLIAM H. AHLERS, ISC '33, 46; formerly with the United States B.A.I. (A.R.S.); practitioner in Dubuque, Iowa, January 23, 1958.

J. FREDERICK AST, SF '07, 81; meat inspector at Menlo Park, California; of injuries received when struck by a car as he was leaving a veterinary meeting; January 28, 1958.

HARRISON V. BAKER, COR '14, 64; track veterinarian and recognized authority on Standardbred horses and harness racing; member A.V.M.A.; at Buffalo General Hospital Buffalo, New York, November 13, 1957.

JACK C. BAKER, API '48, 46; long-time practitioner in Jefferson County Alabama; member of the Jefferson County V.M.A., the A.A.H.A., and the A.V.M.A.; at Homewood, Alabama, December 25, 1957.

WALTER R. BAYNES, OSU '22, 60; member of the North Carolina V.M.A. and A.V.M.A.; at Raleigh, North Carolina, November 3, 1957.

ROBERT BOYD, SF '16, 77; at Mill Valley, California, August 1956.

EARL S. BRADLEY, CIN '15, meat inspector for West Ashville, North Carolina for many years; at West Ashville, North Carolina, November 5, 1957.

ALFRED M. BROLLING, KCV '16, 65; formerly with the Bureau of Animal Industry, both in animal disease control and meat inspection; member A.V.M.A.; at Moorhead, Minn., January 19, 1958.

LEOPOLD A. BROWN, ONT '89, 99, November 23, 1957.

VERNIE H. BROWN, IND '11, 67; at Delphi, Indiana, January 5, 1958.

PETER BURSCHINGER, CVC '14, 74, general practitioner, at Coleman, Wisconsin, January 2, 1958.

JACK K. BUSHNELL, COL '40, practitioner for 14 years in Paris, Kentucky; active in civic affairs; served as secretary of the Kentucky V.M.A., and the A.V.M.A.; at Paris, Kentucky, January 5, 1958.

JAMES J. CUNNINGHAM, UP '25, 55; member of the Keystone, Pennsylvania, New Jersey, and Massachusetts V.M.A.s; at Philadelphia, December 4, 1957.

FOREST DAVIS, CVC '12, 79; from 1912 to 1936 veterinarian in Moulton; state representative from Appanoose Country from 1932 to 1934; postmaster at Moulton from 1936 until retirement in 1952; at Moulton, Iowa, January 24, 1958.

WILLIAM K. DENISON, CVC '12, 64; former practitioner in Oklahoma City and member of Oklahoma V.M.A. and A.V.M.A., at Scottsville, Virginia, January 29, 1958.

GLEN F. EICHHORN, IND '18, 63; at Decatur, Indiana, July 13, 1957.

P. C. FLETCHER, OSU '22; practitioner and regulatory official; county veterinarian in DeWitt County, Illinois; supervising veterinarian in Illinois for the Division of Livestock Industry; member of the Illinois State Veterinary Examining Board for many years; following heart surgery at Geneva, Illinois, December 16, 1957.

MARSHALL H. GANDY, KCV '16, 71; formerly with the Louisiana Livestock Sanitary Board for 15 years; veteran of Army Veterinary Corps; active in civic and social groups in Baton Rouge; at Baton Rouge, Louisiana, January 2, 1958.

MAX C. GRANDY, COL '21, 63; assistant veterinarian at the artificial insemination farm at Colorado State University; following a heart attack at Fort Collins, Colorado, September 9, 1957.

S. B. GRAVES, GR '15; at Allegan, Michigan recently.

SHELBY G. GRAY, 88, retired practitioner; at Walton, Indiana, November 4, 1957.

ROBERT B. GRIMES, KCV '05, 78; with the USDA for 35 years; at Kansas City, Kansas, December 1, 1957.

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Deaths of Veterinarians

Continued

WALLACE R. GUNN, ONT '23, 66, retired director of animal industry for the livestock branch of the Department of Agriculture in British Columbia; more recently with the Health of Animals Division; at Victor British Columbia, December 1957.

CLARENCE W. GUTHRIE, 85; for 53 years practitioner before his retirement in June 1953; at Charleston, Illinois, September 24, 1957.

ARNOLD E. HASSELBALCH, KCV '12, 67, retired practitioner, veteran of World War I, past-member of the Nebraska V.M.A.; at St. Edwards, Nebraska, December 1957.

WALTER H. HAUER, CVC '17, 68; veteran of World War I; at Sidney, Illinois, December 3, 1957.

WARD B. HERLEMAN, CVC '10 Waynesboro, Georgia.

DAVID C. HOUSER, KCV '08, general practitioner; at Jasper, Missouri, February 9, 1958.

LEONARD L. HOWELL, COR '32; at Wellsville, New York, November 22, 1957.

R. M. JOHNSTON, 73, practitioner in Trinity and Houston counties, Texas 50 years; at Apple Springs, Texas, January 1958.

WILLIAM J. WALSH, KCV '18; Creston, Iowa, September 27, 1957.

JULIUS G. WATTENBERG, KCV '16, 67; practitioner; at Washington, Missouri, September 21, 1957.

CHARLES A. WEBER, CVC '07, 73, practitioner at Zanesville, Ohio for 42 years; retired in 1947; at Womelsdorf, Pennsylvania.

EDWARD H. WELLES, SR., API '17, 64, practitioner; member of the A.V.M.A.; civic leader (particularly in the Boy Scout movement); at Union City, Tenn., October 3, 1957.

DELMAR C. WEST, KVC '14, 74; well known practitioner in Seward County, Nebraska; member of the school board, town board, chamber of commerce, and volunteer fire department; at Mildord, Nebr., August 27, 1957.

EARL F. WHIPPLE, COR '23, at Rochester, N. Y., January 12, 1957.

ROY B. WHITESELL, IND '10, member A.V.M.A. at Lafayette, 2nd., August 6, 1957.

DON R. WILSON, SR., KCV '16. 63, federal meat inspector at Dothan, Ala.; member of A.V.M.A.; at San Antonio, Tex., October 31, 1957.

FLOYD P. WILCOX, GWU '16, at Los Angeles, Calif., April 13, 1957.

CHARLES F. WOOLSTON, GR '05, at Orleans, Mich., April 7, 1957.

FRANK A. WRIGHT, UP '07, at Morrestown, New Jersey recently.

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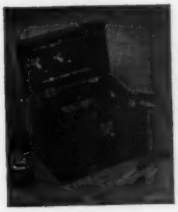
for the determination of the Urea content of the blood.



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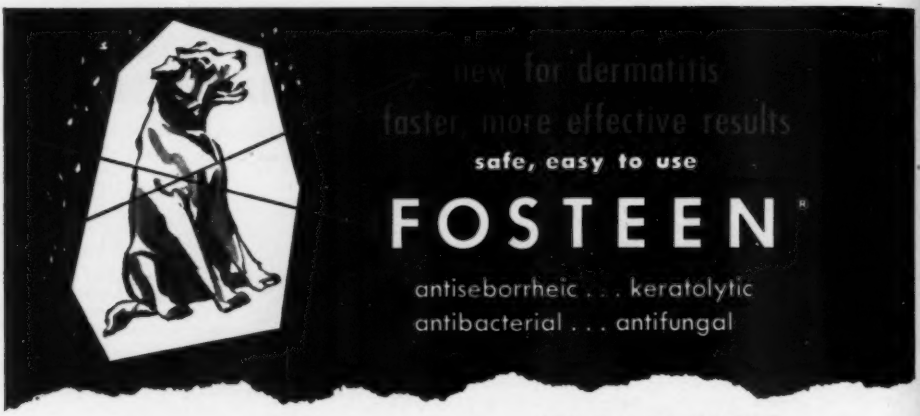

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***Available** in 4.5 oz. and 3 lb. jars.*

Clinical results in 592 dogs

Condition	Total Number	Good to Excellent Results
Weeping dermatitis ("Moist Eczema")	217	200-(92%)
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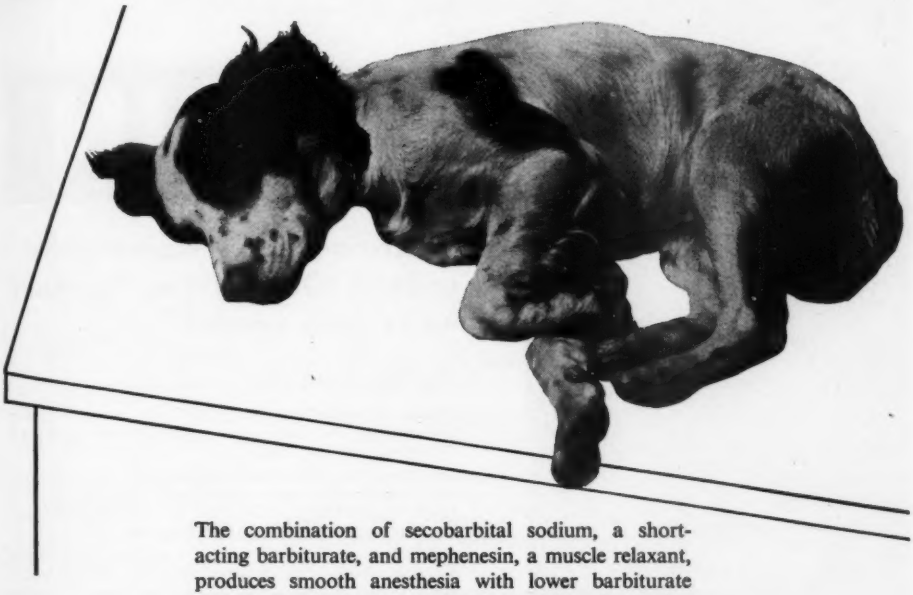

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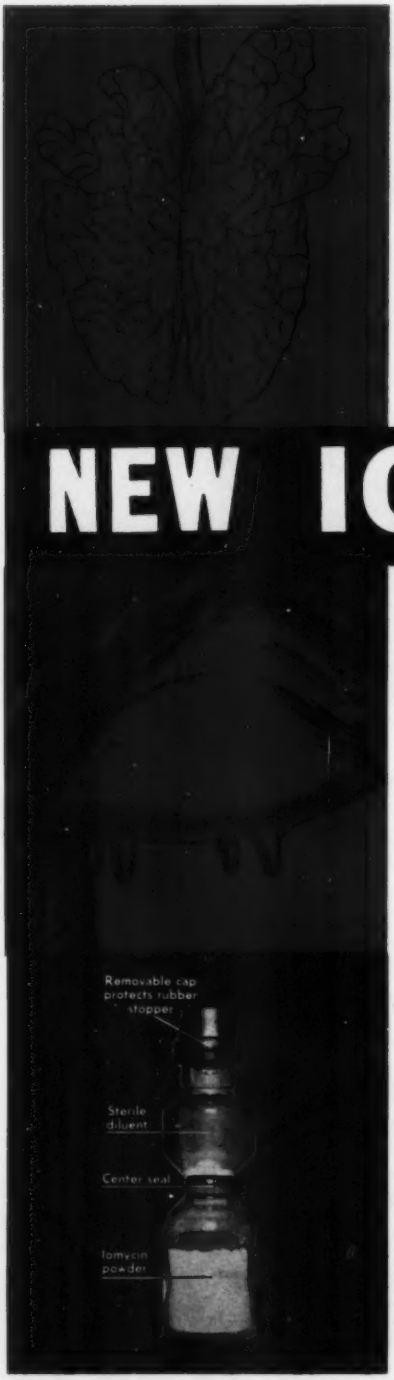

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[1]Provides up to 5 times more concentration in these tissues than procaine penicillin G.

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Dihydrostreptomycin Sulfate (base), 2.5 grams
with sterile diluent for injection
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